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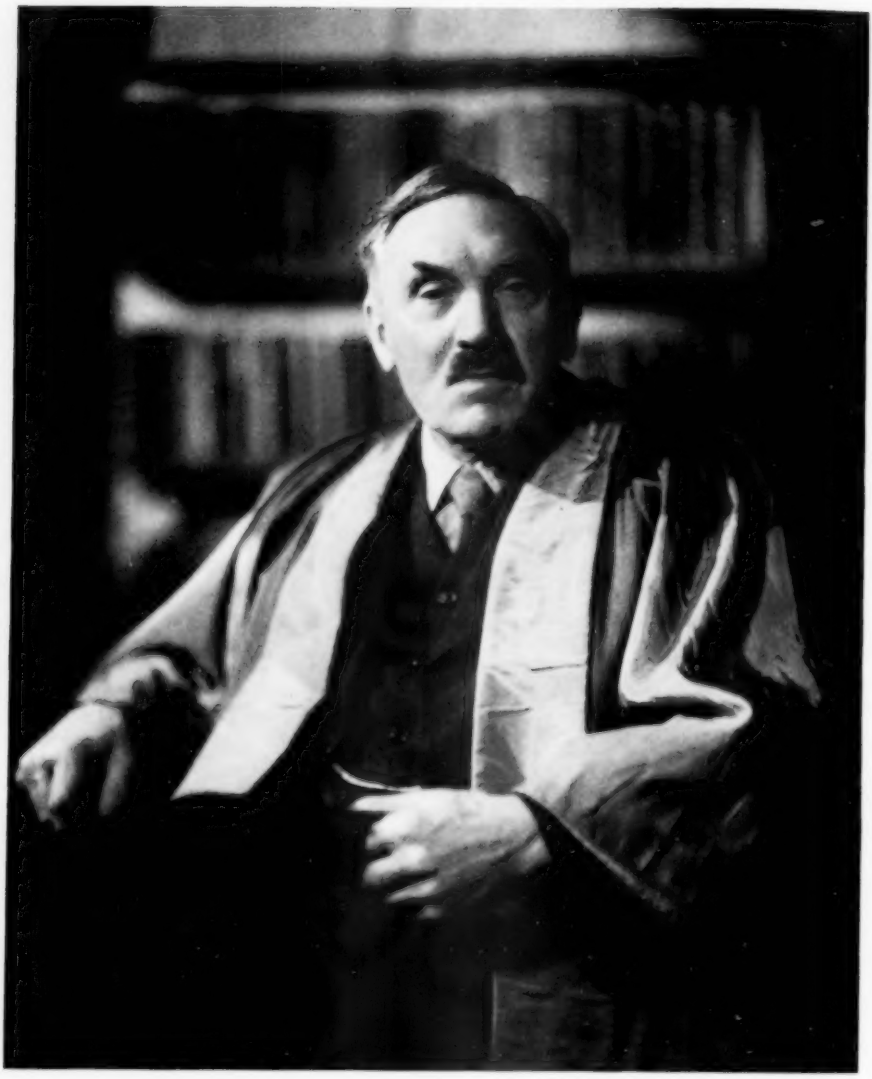

Francis Joseph Cole, 1872-1959
(Photograph by Howard Coster)

Francis Joseph Cole, 1872-1959*

N. B. EALES**

F. J. COLE was born in London, England, on 3 February 1872. He was educated at Sir Walter St. John's School, Battersea, where his scholastic achievements made little impression on his teachers, although they recognised that he could write well. With a school friend, John O. Borley, he began the process of educating himself, though it must not be inferred that he was a prig, for he played football and cricket, captained a cricket eleven that played at Mitcham, and practised his left hand bowling daily in the large garden of his home at Clapham. His mother did not interfere in the strange activities of her youngest son, who, with Borley, set up a laboratory in his bedroom and, stimulated by the works of Darwin, which they read together, dissected earthworms and other small animals. Every week the two boys visited the second-hand bookshop of Mr. Salkeld in the Wandsworth Road and browsed in the sixpenny box. One of their first purchases was Bastian's *Evolution and the Origin of Life,* which remained in Cole's library all his life.

Because of his command of the English language, it was considered appropriate that on leaving school he should take up journalism. For a time he worked on local newspapers in Surrey and Sussex, then in Fleet Street, but despite the thrill of the City, the top hat and morning coat, reporting and writing articles for the press, he was not happy. He was still striving after knowledge and his aim was to go to Oxford and read zoology. Accordingly, he prepared himself for University entrance and took private lessons in chemistry, French, German, and Latin. Greek he taught himself. Zoology he learnt at the Royal College of Science, under Professor G. B. Howes, and he also attended lectures at the Royal Institution by Dr. J. G. Romanes, who encouraged him to enter Christ Church, Oxford, and to act as his assistant in research. But Romanes became ill, Cole's financial position was unsound, and he was obliged to leave Oxford. Dr. Romanes, however, recommended the disappointed young man to Professor Cossar Ewart, Professor of Natural

*Professor Cole served as a Consultant Editor to the *Journal of the History of Medicine* from the first volume in 1946 until his death on 27 January 1959.

** Henley-on-Thames, England.

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History at the University of Edinburgh, and thither Cole went in 1892 as private assistant to the Professor, at a salary of £1 per week. He lodged with two stimulating and remarkable men—Sutherland Simpson, later Professor of Physiology at Cornell University, and John Flett, who became Director of the Geological Survey, first of Scotland and then of England. Cole worked assiduously to expand his knowledge of zoology and began his series of beautiful and mature researches on the brain and cranial nerves of fishes.

In 1894 he left Edinburgh on his appointment as lecturer in zoology at Liverpool University College, later the University of Liverpool. He stayed there for twelve years and in 1901 was able to combine work during term time at Liverpool with research during vacation at Jesus College, Oxford. In this way he obtained a B.Sc. degree at Oxford by research.

In 1898 he married Annie Clow Menzies. Their only son is now a master farmer in Ontario, Canada.

In 1906 Cole took up an appointment as lecturer in zoology at University College, Reading, and in the following year became the first occupant of the chair of zoology, which he held until his retirement in 1939. In these thirty-two years he built up a flourishing department, founded a Museum of Comparative Anatomy which is now called by his name, pursued his research, worked actively for the foundation of the University of Reading, which received its charter in 1926, and collected a magnificent library of early works on medicine and comparative anatomy. He had time for new hobbies; he became an expert on ecclesiastical architecture and wrote a book on the Church of St. Mary, Cholsey, Berkshire, one of the most interesting parish churches in England, applying scientific methods to the solution of an architectural problem. He took superb photographs of all the ancient churches in the neighbourhood. Though he could not play the pianoforte, his performance of classical music on his pianola attached to a Broadwood grand piano was so skilled that it delighted his audiences of colleagues and students. He learnt about pictures and visited art galleries in western Europe. But above all he studied literary style in the great English prose masters, believing that to write history well one must acquire not only knowledge, but the ability to express it gracefully and authoritatively.

His early research was on the cranial nerves and sense organs of fishes. For his beautiful and accurate researches on the cranial nerves of *Chimaera* he was awarded the Rolleston Prize at Oxford in 1902. Later he published a series of papers on the myxinoid fishes

and received the Neill Gold Medal and Prize of the Royal Society of Edinburgh in 1908. His D.Sc., Oxford, followed in 1910. He had a vast and practical knowledge of the marine fauna, as students who worked with him on the shore and on dredging expeditions can testify. He was a delightful companion on field excursions.

During World War I he was commissioned in the 4th Territorial Battalion of the Essex Regiment and was stationed on the east coast in charge of a coastal gun emplacement. Returning to Reading after the war he turned more and more to the history of biology, for which his strong literary bent and his library were admirable equipment.

In 1925 he delivered two lectures at King's College, London, on the history of protozoology. These were published in the following year. In 1926 he was elected a Fellow of the Royal Society. The year 1930 saw the publication of his *Early Theories of Sexual Generation*. In 1936 he and Mrs. Cole paid one of five visits to their son in Ontario and attended the Tercentenary Celebrations at Harvard, where he represented the University of Reading. They also visited Yale, and Cole had a delightful talk with Dr. Harvey Cushing on Vesalius.

His interest in protozoology led him to the works of the early microscopists. In 1937 he published two papers on the zoological researches of Leeuwenhoek, and in the following year his lecture to the Quekett Microscopical Club on "Microscopical Science in Holland in the Seventeenth Century" was printed. In 1951 he gave the Wilkins Lecture before the Royal Society, his subject being "The History of Microdissection." His major work, *A History of Comparative Anatomy from Aristotle to the Eighteenth Century*, appeared in 1944, and was reprinted, with corrections, in 1949. During his retirement he wrote many essay reviews, as well as papers on historical subjects, such as "William Croone on Generation" (1947), "The History of Albrecht Dürer's Rhinoceros in Zoological Literature" (1953), "Bell's Law" (1955), "Henry Power on the Circulation of the Blood" (1957), and "Harvey's Animals" (1957). His last publication, written at the age of 85, was entitled "Obiter dicta bibliographica" (1958)* and described vividly his activities as a book collector. His mind was active until the end of his eighty-sixth year. He suffered a stroke on 10 January 1959, and a second stroke seventeen days later was immediately fatal.

* This and the two preceding papers were published in this Journal.

An account of the Cole Museum was published in *Nature* (1956, *177*, 555-556), but no description of his fine library has been written. He began buying books out of his lunch money when he was still a school boy; at the time of his death he had about 8,000 volumes on the history of zoology. Almost every book was complete and in good condition. After collating a new purchase, it was treated with a home-made preservative of beeswax, turpentine, and beechwood oil, its shelf number was entered, and entries were then prepared for the catalogue, a blue card for the book and its author and date, and white cards for the subjects dealt with in the book. Hence every book in the library had been used by its owner, and for the reader it was possible to refer directly to all the books dealing with a given subject. A coloured plan of the book cases and the numbers of their shelves facilitated easy access to any book. So complete is the library that when he wrote his *History of Comparative Anatomy* he was able to do so almost entirely from his own resources.

Cole believed that a book collector should know how to bind and repair books. In visits to booksellers he would search for old boards and end papers, which he used on the repair of damaged books. For books requiring rebinding he favoured vellum, and his copies of Galen, the first edition of Vesalius, Pliny, and the Gaza translation of Aristotle's History of Animals were bound in that durable material by a skilled bookbinder, Mr. R. E. Goodall. All separates were bound in groups. If a complete copy of a book could not be purchased, he made it complete. For example, to complete Malpighi's *Opera omnia,* 1687, he bought three copies, photographed twelve plates from the original Malpighi MSS and drawings in the possession of the Royal Society, and built up a copy complete with the Portrait and the Life—the only one known to him in such perfection. If he failed to obtain missing plates he completed his copy by incorporating paper of the period, to which was transferred a photograph of each plate printed on a fine tissue-like paper. The library contains two incunabula, Pliny's *Natural History* in the third edition, 1472, with thirty-seven illuminated initials, and Aristotle's *Book of Animals* in the first edition, Venice, 1476, dedicated to Pope Sixtus IV, translated into Latin by Theodorus Gaza. A section (signature bb) was missing, and Cole had the ten pages photographed and bound up in the volume. Annotations in a fifteenth century hand were added by Angelus Calydonius in 1491.

Among the sixteenth century books are the works of Vesalius, Estienne, and Galen. The copy of the first edition of Vesalius' *De humani corporis fabrica,* 1543, is the second largest known and is complete except for one unpaginated leaf, which is now represented by a photofacsimile. Cole had the volume rebound in vellum. The second edition, 1555, is in its original tooled leather binding with metal clasps, the binding a year earlier and the pages larger than Dr. Harvey Cushing's copy. Estienne's *La dissection des parties du corps humain,* 1546, is a very beautiful copy, handsomely bound in leather and tooled in gold. Galen's *Opera omnia* is in the second Giunta edition, 1550, and is bound in seven volumes.

The seventeenth century is represented not only by many famous books by individual authors, but also by complete series of rare publications of the learned societies of the period. There is a very fine copy, bound in vellum, of the *Pentaestheseion* of Giulio Casserio, Venice, 1609, and also, with the portrait, of his work on the organs of speech and hearing (Ferrara 1600-1601). Four items by Fabricius of Aquapendente are all in good condition, particularly the *Opera chirurgica,* Leyden, 1723. The works of "that famous Chirurgion Ambrose Parey" are present in the first issue of the first English edition, 1634, again a fine copy. One of the earliest records of tropical diseases is found in the *De medicina Aegyptiorum,* Paris, 1645, of Prospero Alpino. The first comprehensive work on comparative anatomy is present in the rare first edition of Severino, *Zootomia Democritaea,* Nuremberg, 1645.

Cole studied the works of William Harvey and wrote many articles on him. He possessed six editions of the *De generatione animalium,* including the first edition of 1651 and the English edition of 1653. He did not own a first edition of the *De motu cordis,* 1628, but had a copy of the facsimile published at Canterbury in 1894, a good copy of the Latin edition with the two letters to Riolan published at Rotterdam in 1671, the French translation of 1879, and the English translations of Chauncey D. Leake, 1928, and Kenneth J. Franklin, 1957. Fine copies of the first edition of Thomas Willis's *Cerebri anatome,* 1664, the *De anima brutorum,* 1674, *The remaining medical works,* with portrait, 1681, the *Opera omnia,* 1682, and his *Practice of physick,* 1684, should be mentioned. Cole was especially interested in the works of Leeuwenhoek and Malpighi. He had many of the publications of the indefatigable Dutchman, including some of the letters and the rare Dutch edition of 1684-1718, in the original vellum binding. His

copies of Malpighi's *Opera omnia,* 1687, and *Opera posthuma,* 1697, are magnificent. He possessed also first editions of the treatises on the honey bee, 1669, on the development of the chick, 1673, and on the anatomy of plants, 1675-1679. There is a very fine copy of the *Systeme of anatomy, treating of the body of man, beasts, birds, fish, insects and plants* by Samuel Collins, in two volumes, with portrait, 1685.

The outstanding books of the eighteenth century include works of Manget, Stubbs, and the two Hunters. Cole had a great admiration for John Hunter and his famous Museum of Comparative Anatomy; he modelled his own Museum on Hunter's plan. More modern works need not be mentioned, except perhaps to note that he had the first, second, and third series of the *Index Catalogue of the Library of the Surgeon General's Office, United States Army,* which he used constantly, and the following facsimile editions, all very valuable sets, of the works of Leonardo da Vinci: Paris, 1893, 1898, and 1901; and Christiania, 1911-16.

Cole was a most charming and lovable man. Simple and modest, he led the austere life of the scholar, happy in his work and among his books. Social functions he rarely attended, but he delighted in welcoming his friends or new acquaintances to his home and showing them some of his treasures. Visitors came from many parts of the world to do honour to his scholarship and pleasant companionship. In all his work he aimed at perfection, and he expected his students to strive to attain the standard he had set for himself.

Distinguished in appearance and bearing himself with calm dignity, he seemed severe at first sight, but he was kind and friendly, always ready to help others from his exceptional store of knowledge, to advise those who came to him for counsel, and to amuse and entertain them with his experiences. His memory will be honoured in the Museum which he founded and in the library which he so lovingly collected.

The Medical and Surgical Practice of the Lewis and Clark Expedition*

DRAKE W. WILL**

I

ON the last day of February in 1802 Thomas Jefferson wrote, in part, to Benjamin Rush in Philadelphia: "I wish to mention to you in confidence that I have obtained authority from Congress to undertake the long desired object of exploring the Missouri and whatever river, heading with that, leads into the western ocean . . ." He briefly delineated the plans for the expedition and introduced the member of his own official household, Meriwether Lewis, who was to lead this long-cherished project, from whom he requested that:

> It would be very useful to state for him those objects on which it is most desireable he should bring us information. For this purpose I ask the favor of you to prepare some notes of such particulars as may occur in his journey and which you think should draw his attention and inquiry. He will be in Philadelphia about 2 or 3 weeks hence and will wait on you."[1]

The busy, hard-working doctor-statesman, always behind in attending to his correspondence, had already received a cordial and flattering letter from the President the previous summer, telling in detail of his distress from a recurrent diarrhea which had plagued him for some two years.[2] Dr. Rush set about to correct his tardiness toward an illustrious patient and wrote immediately to the capital, killing two birds with one stone. In a few lengthy paragraphs, he advised Mr. Jefferson on the means of treating his gastrointestinal disease[3] and inserted another short paragraph in which he acknowledged the President's later request, writing: "I shall expect to see Mr. Lewis in Philadelphia and shall not fail of furnishing him with

* John Farquhar Fulton Medal Essay, 1957, of the Society for the History of Medical Science, Los Angeles.

** Department of Pathology, School of Medicine, University of California, Los Angeles 24.

1 Ford, Paul L., Ed. *The works of Thomas Jefferson*. New York, Putnam, 1904-05, IX, p. 452.

2 *Ibid.*, VIII, pp. 219-221.

3 Jefferson's lack of sympathy with the medical practice of his day, particularly to treatment with drugs, was well known to Rush, and the letter contains very general directions but does venture to recommend some spirits.

a number of questions calculated to increase our knowledge of subjects connected with medicine."[4]

Several days later, Dr. Rush entered in his "Commonplace Book," an extensive, highly personal diary, a list of questions for Mr. Lewis against his arrival for the personal conference that Jefferson wished. Jefferson had also sent similar requests to aid Lewis to several other Philadelphians, including Caspar Wistar, professor of anatomy in the medical school, and Benjamin Barton, professor of natural history, who was to succeed to Rush's chair on his death in 1813.

The young soldier, whose family were Virginia neighbors of Jefferson's, had just spent two years as the President's personal secretary in Washington, watching the events unfold which led to the exploration that he was now appointed to direct. He was as familiar as anyone could be with Jefferson's private and public conceptions of the western exploration and, with his own love of the wilderness, a recent tour of frontier military duty, and intense personal loyalty for the President, was well-fitted for the task. At this early stage, he was not only to be the leader of the expedition but was also the quartermaster, engineer, and general factotum. Jefferson had sent him with ample letters of credit in his own hand to the government arsenals and depots to assemble supplies and instruments before he sought out a group of scientists in Philadelphia who were to tutor him, at the President's request, in the essentials of scientific observation.

But Lewis was delayed by miscalculations and misfortune. He was detained a month at Harper's Ferry, supervising the building of the frame for the iron boat that was to carry the expedition down the broad, wide, supposedly rapid-free Columbia to the western ocean. On 20 April he was only at Lancaster as a letter to the President vouches,[5] and he apologized to Jefferson for the delay. He added that he would spend ten or twelve days with Andrew Ellicott, who was at that time Surveyor General of the United States, studying surveying and the use of mathematical instruments.

When Capt. Lewis finally reached Philadelphia, the immediate necessity was the gathering of equipment and supplies. His letter of credit and orders were submitted to the federal purchasing agent who began to assemble and issue the necessary materials. Lewis then was able to turn his attention to his most recent communica-

[4] Butterfield, L. H., Ed. *The letters of Benjamin Rush.* Published for the American Philosophical Society by Princeton University Press, Princeton, N. J., 1951, II, p. 858.

[5] Thwaites, R. G., Ed. *Original journals of the Lewis and Clark expedition.* New York, Dodd, Mead, 1904, VII, pp. 213-216.

tion from the President. Jefferson sent a rough draft of the official instructions for the expedition and proposed, in addition, "your instructions being known to Mr. Patterson, Docrs. Wister, Rush, & Barton these instructions may be submitted to their perusal. . . . These gentlemen will suggest any additions they will think useful as has been before asked of them."[6] He began working with Robert Patterson, an Irish physician and professor of mathematics at the University, who gave him intensive instruction in navigation and astronomical measurements.

Though it is highly probable that Lewis saw Dr. Rush very shortly after his arrival in Philadelphia in early May, Rush waited before he wrote to the President, apparently shortly after another call by the young explorer, perhaps the last. Enthusiastic about the expedition, Rush also noted that Lewis appeared admirably qualified to lead it. Of greater interest, he wrote:

> I have endeavored to fulfill your wishes by furnishing Mr. Lewis with some inquiries relative to the natural history of the Indians. The enclosed letter contains a few short directions for the preservation of his health, as well as the health of the persons under his command.[7]

Rush gave Lewis a personal copy of the "Questions"[8] and of the "Directions" reproduced below, and another copy of the "Directions" was appended to his letter to Jefferson.[9]

Questions to MERRYWEATHER LEWIS
before he went up the Missouri[10, 11]

I. Physical history and medicine

1. What are the acute diseases of the Indians? Is the billious fever attended with a black vomit?
2. Is apoplexy, palsy, epilepsy, madness, rheum[atic] disease, goitre known among them?
3. What is the state of life as to longevity? At what age do the women *begin* and *cease* to menstruate?

[6] *Ibid.*

[7] Butterfield, *op. cit.*, II, p. 868.

[8] The list of questions was similar to those Rush had previously prepared for Alexander McGillivray in 1790, and again, in 1791, for Timothy Pickering, who had been adjutant-general on Washington's staff when Rush was physician-general of the Middle Department. See Corner, George W., Ed. *The autobiography of Benjamin Rush. His "Travels Through Life" together with his Commonplace Book for 1789-1813.* Princeton, N. J., American Philosophical Society by the Princeton Univ. Press, 1948, p. 189; Butterfield, *op. cit.*, I, pp. 480-481.

[9] The President kept a personally transcribed copy of the "Directions" when he returned the Rush letters in his possession to the family after the physician's death.

[10] Corner, *op. cit.*, pp. 265-267.

[11] The preparation of the scientific reports of the expedition was never undertaken, due to personal and political difficulties of Lewis, the logical author, and his tragic death in 1807. Only Jefferson's great personal efforts saved the journals for preservation. There is no evidence that the "Questions" were ever answered, except indirectly in the journals.

4. At what age do they marry? How long do they suckle the children? What is the provision of their children after being weaned?
5. The rate of the pulse as to frequency in the morning, at noon, and at night, before and after eating?
6. What is its state in childhood, adult life, and old age? Is it ever subject to intermissions? The number of strokes counted by the quarter of a minute by glass, and multiplied by four will give its frequency in a minute.
7. What are their remedies?
8. Are artificial discharges of blood ever used among them?
9. In what manner do they induce sweating? Do they ever use voluntary fasting? At what time do they use their baths?
10. What is the diet, manner of cooking, and times of eating among the Indians? How do they preserve their food?

II. Morals

1. What are their vices?
2. Is suicide common among them? Ever from love?
3. Do they employ any substitute for ardent spirits to promote intoxication?
4. Is murder common among them, and do they punish it with death?

III. Religion

1. What affinity between their religious ceremonies and those of the Jews?
2. Do they use animal sacrifices in their worship?
3. What are the principal objects of their worship?
4. How do they dispose of their dead, and with what ceremonies do they inter them?

May 17, 1803 B. RUSH

In the manuscripts belonging to the Clark family, a long list of questions in Clark's handwriting entitled "Inquiries relitive to the Indians of Louisiana" embodies the queries of Rush verbatim or with some changes in phraseology, apparently transcribed from instructions of Jefferson to the captains.[12] As would be expected, several of Rush's questions relate to bilious fevers, diseases with which his name and reputation are associated in the history of American medicine. Included among the questions in Clark's "Inquiries" are several which Rush might have been expected to ask but inexplicably did not, e.g., "What is their mode of treating the Small pox particularly?" One strongly suspects that this last query is Jefferson's own addition.

On the same day that he wrote to Jefferson of Lewis' visit, Rush had made a rough copy in the "Commonplace Book" of a simple

12 Thwaites, *op. cit.*, VII, pp. 283-287.

Directions for Mr Lewis for the preservation
of his health & those of who are to accompany him.

1. A flannel worn next to the skin will in
wet weather

2 Always to take a little raw Spirit, after being
very wet or much fatigued — also to and
as little as possible at any other time.

3 In when you feel the least indisposition, fasting &
abstaining drinks
for a few hours. take a breat - if costive take
two a purge - of two - four pills pills
every four hours until they operate freely.

4 Unusual costiveness is often a sign of an
approaching disease - when you feel it, take
one or two of the opening pills.

5. Where salt cannot be had with your meat,
a day or two
steep it in a Ley. made of

6 In difficult & laborious enterprizes, or marches,
eating sparingly but will enable you to bear them with
the less you eat, till they are over the better
& fatigue & less more safety to y health.

7 Washing feet with Spirit when chilled, & every
morning with Cold water.

8 molasses or sugar & water with Vit: Acid for
drink with meals. 9 shoes without heels.

10 Lying down when fatigued.

June 11. 1803.

FIG. 1. Rush's first draft of the Directions for Mr. Lewis in his *Commonplace Book*, 11 June 1803. By permission of the American Philosophical Society, Philadelphia.

set of rules which he entitled "Directions for MR. LEWIS for the Preservation of his Health and of those who were to accompany him."[13] In Jefferson's papers, under the same date, 11 June 1803, is a copy in the President's own hand of the same directions rearranged and somewhat expanded, which is assuredly a transcription of the final draft sent to Jefferson by Rush as previously described. The originals of the "Directions" and the "Questions," which were given to Lewis, have never been found. The final draft, from Jefferson's copy, is reproduced here (Figs. 1 and 2):

D[r] Rush to Capt. Lewis. for preserving his health. June 11. 1803[14]

1. when you feel the least indisposition, do not attempt to overcome it by labour or marching. rest in a horizontal posture.—also fasting and diluting drinks for a day or two will generally prevent an attack of fever. to these preventatives of disease may be added a gentle sweat obtained by warm drinks, or gently opening the bowels by means of one, two, or more of the purging pills.

2. Unusual costiveness is often a sign of approaching disease. when you feel it take one or more of the purging pills.

3. want of appetite is likewise a sign of approaching indisposition. it should be obviated by the same remedy.

4. in difficult & laborious enterprises & marches, eating sparingly will enable you to bear them with less fatigue & less danger to your health.

5. flannel should be worn constantly next to the skin, especially in wet weather.

6. the less spirit you use the better. after being *wetted* or *much* fatigued, or long exposed to the night air, it should be taken in an undiluted state. 3 tablespoonfuls taken in this way will be more useful in preventing sickness, than half a pint mixed with water.

7. molasses or sugar & water with a few drops of the acid of vitriol will make a pleasant & wholesome drink with your meals.

8. after having had your feet much chilled, it will be useful to wash them with a little spirit.

9. washing the feet every morning in *cold* water, will conduce very much to fortify them against the action of cold.

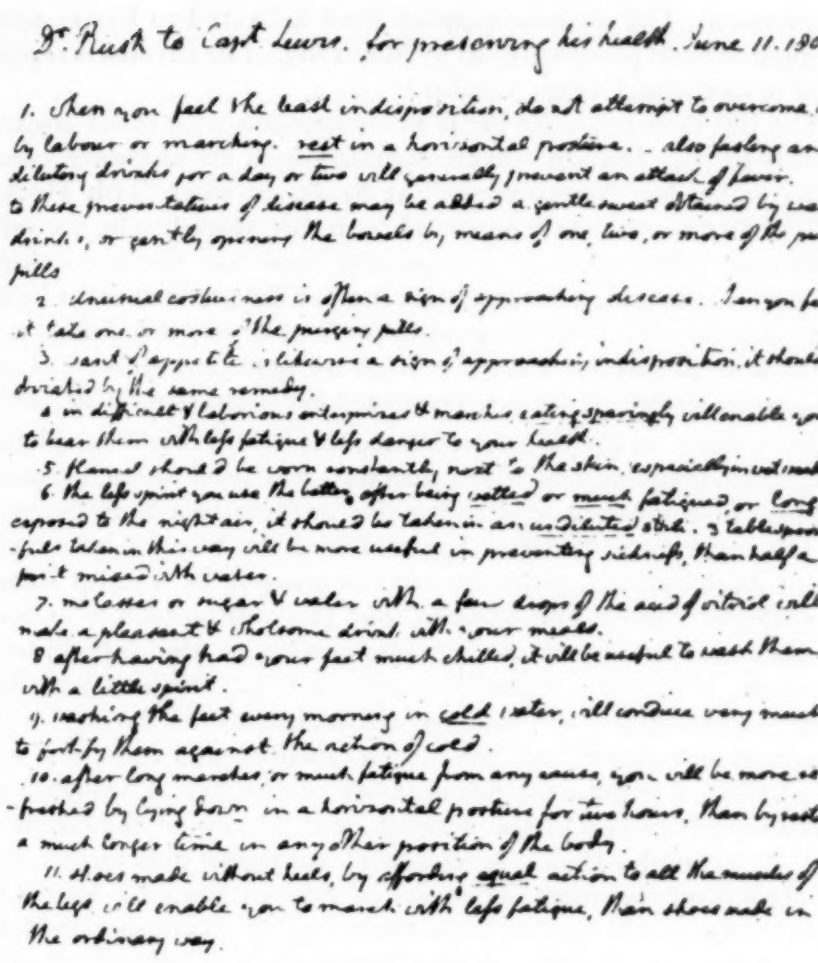
10. after long marches, or much fatigue from any cause, you will be more refreshed by *lying down* in a horizontal posture for two hours, than by resting a much longer time in any other position of the body.

11. shoes made without heels, by affording equal action to all the muscles of the legs, will enable you to march with less fatigue, than shoes made in the ordinary way.

The medical and surgical materials which Lewis required were assembled without difficulty. An initial list of drugs and supplies drawn up in Washington or enroute to Philadelphia is quite brief;

[13] Corner, *op. cit.*, pp. 265-267.

[14] Papers of Thomas Jefferson, Library of Congress, dated 11 June 1803 (see illustration).



Dr. Rush to Capt Lewis. for preserving his health. June 11. 1803.

1. When you feel the least indisposition, do not attempt to overcome it by labour or marching. rest in a horizontal posture. - also fasting and dilutory drinks for a day or two will generally prevent an attack of fever. to these preventatives of disease may be added a gentle sweat obtained by warm drinks, or gently opening the bowels by means of one, two, or more of the purging pills

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4. in difficult & laborious enterprises & marches eating sparingly will enable you to bear them with less fatigue & less danger to your health.

5. flannel should be worn constantly next to the skin. especially in wet weather.

6. the life spirit you use the latter, after being wetted or much fatigued, or long exposed to the night air, it should be taken in an undiluted state. a tablespoonful taken in this way will be more useful in preventing sickness, than half a pint mixed with water.

7. molasses or sugar & water with a few drops of the acid of vitriol will make a pleasant & wholsome drink with your meals.

8 after having had your feet much chilled, it will be useful to wash them with a little spirit.

9. washing the feet every morning in cold water, will conduce very much to fortify them against the action of cold.

10. after long marches, or much fatigue from any cause, you will be more refreshed by lying down in a horizontal posture for two hours, than by resting a much longer time in any other position of the body.

11. shoes made without heels, by affording equal action to all the muscles of the legs will enable you to march with less fatigue, than shoes made in the ordinary way.

FIG. 2. A final draft of Rush's directions for Lewis in the Jefferson Papers, Library of Congress, transcribed by the President in his own hand.

the final bill is far more detailed.[15] It seems probable that Rush made up or at least edited this final order Lewis gave to the suppliers since an item of fifty dozen bilious pills, made to his prescription, was included. Only $55 was budgeted for medicine, and Lewis must have been somewhat disturbed at the final bill of $90.69 which dipped further into his total appropriation of $2,500 than he

[15] In personal correspondence of R. G. Thwaites in the possession of the Wisconsin State Historical Society a letter from E. C. Stacey in Washington, D. C., dated 26 May 1904, to H. C. Powers, Sioux City, Iowa, describes the original search for the papers. Stacey learned from the War Department that the Tripolitanian piracy expeditions were outfitted at Philadelphia. The Depot Quartermaster in that city "had the matter carefully looked up and furnished me with copies of the records as specified. . . ." Mr. Victor Gondos, Jr., Archivist, Old Army Branch, General Services Administration, after prolonged search, has rediscovered these documents in the National Archives and they are illustrated here.

had planned. The medical supplies were delivered to Lewis, who receipted the bill personally, on 27 May 1803. The invoice is reproduced in its entirety (Figs. 3 and 4).

The bill does not seem great in comparison with other costs.[16] Presents for the Indians, which included such an unknown commodity as "2 doz. Nonesopretty" at $2.94, or 2800 "Fish Hooks assd." at $8.00, cost nearly $700 and even this proved to be entirely insufficient. The single most expensive item was the $250 chronometer. Lewis added an expensive item to the medical bill a little later when he purchased two pounds of tea at nearly two dollars per pound, a luxury which was to be saved for medicine alone, its cost being equal to that of the best powdered Peruvian bark available.[17]

Some items on the list of medicaments require further explanation. Saccharum saturni (lead acetate) was used as an urethral injection in gonorrhea, though for this purpose balsam of copaiba was felt to be more specific. Sugar of lead was also an important part of Rush's armamentarium, used extensively by him for infantile epilepsy, chorea, and hysteria, but this substance was to play the most important part in the preparation of the expedition's collyrium, which the explorers made in large amounts and dispensed freely. Elixir of vitriol, or ethylsulfuric acid flavored with cinnamon and ginger, was given with cinchona as a tonic and was described in a prominent dispensatory of the day as valuable in weakness, relaxations of the stomach, and "decays of the constitution."[18] "Columbo Rad.," an esteemed astringent and bitters, was prepared from the roots of species of *Frasera* from Ceylon (Colombo, "the root") or from the Ohio Valley (columbo of Marietta). Balsam traumatick, originally known as Turlington's balsam, was an American formulation for compound tincture of benzoin which, with basilic ointment (rosin cerate), calamine ointment, and diachylon (lead oleate), comprised the drugs used in wound dressings.

Nothing was used more often, to judge by the expedition's journals, than Rush's potent bilious pills. In his famous battle with yellow fever in the Philadelphia disasters which began in 1793, Rush came to feel that the effluvium of bile in the fevers accompanied by jaundice must be relieved by prompt evacuation and in 1793 described his powerful remedy.[19] Known as "ten and ten," an

16 Thwaites, *op. cit.*, VII, pp. 238-246.
17 Thwaites, *op. cit.*, VII, pp. 238-246.
18 Thacher, J. *The new American dispensatory*. 4th ed. Boston, T. B. Wait, 1821, p. 559.
19 Butterfield, *op. cit.*, II, pp. 648 cf.

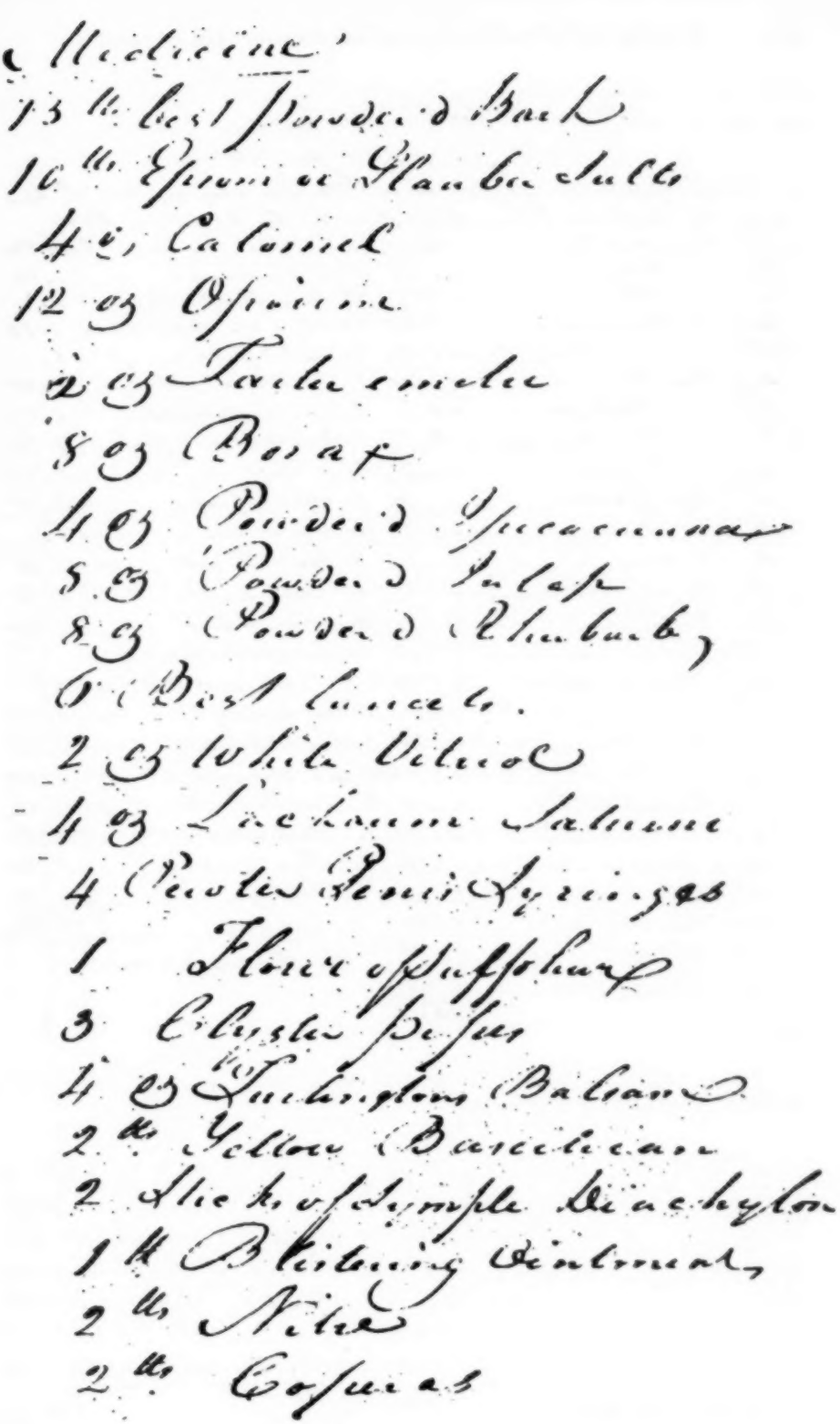
Medicine
13 lb best powdered Bark
10 lb Epsom or Glauber Salts
4 oz Calomel
12 oz Opium
2 oz Tartar emetic
8 oz Borax
4 oz Powdered Ipecacuanha
8 oz Powdered Jalap
8 oz Powdered Rhubarb
6 Best lancets.
2 oz White Vitriol
4 oz Lac lunae Saturne
4 Pewter penn Syringes
1 Flour of Sulphur
3 Cakes Portugal
4 oz Turlington Balsam
2 lb Yellow Basilicon
2 Sticks of Lymple Diachylon
1 lb Bleiberg Ointment
2 lb Nitre
2 lb Coffee

FIG. 3. Lewis' original list of medical supplies (National Archives).

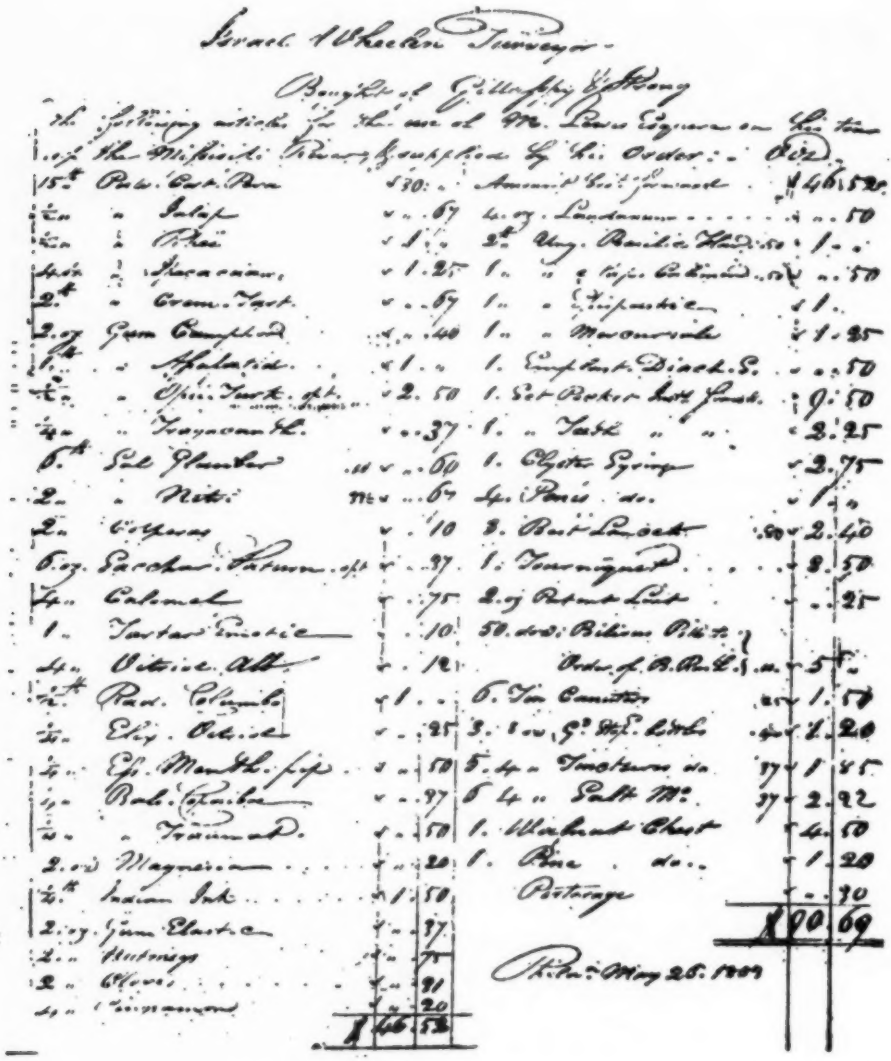

FIG. 4. Bill of sale for the medical supplies of the Lewis and Clark expedition (National Archives).

equal mixture of calomel and jalap, it was adapted by Rush in 1793 to calomel, gr x, and jalap, gr xv, "to carry the calomel through the bowels." It is known that he also prescribed calomel and gamboge pills, still officially known as compound mild mercurous chloride pills in the American pharmacopeia, "so as to procure large evacuations from the bowels."[20] The 600 pills the explorers packed into their gear were undoubtedly the calomel and jalap

[20] *Ibid., II,* pp. 699 cf.

"Bilious Pills to Order of B. Rush," a quantity sufficient to have combatted even more than the "unusual costiveness" Rush described in his suggestions to Lewis for his health.

Lastly there were six kegs containing 30 gallons of spirits of wine. With the thoroughly detested dehydrated "portable soup," they were listed as "Provisions &c" in the records still extant.[21] The spirits figure high in the annals of the expedition and were the basis of many remedies and decoctions prepared by the captains and a welcome tonic on many an exhausting, cold, and discouraging afternoon.

His purchases completed, Lewis returned to Washington briefly while the goods and equipment were drayed to Pittsburgh and, on 30 August 1803, after many agonizing delays, the capable and earnest young man, with a platoon of soldiers, cast off in a flatboat into the Ohio River bound for the Mississippi.

William Clark joined Lewis and his party in Louisville. A militiaman like Lewis and brother of George Rogers Clark, William Clark had been Lewis' commander for a short time on the western frontier. A more experienced soldier than the younger Lewis, Clark was Lewis' choice as co-leader, and their great mutual respect and varied gifts led to a joint command of unusual harmony and effectiveness. The explorers continued down the Ohio to Kaskaskia and there Lewis left for St. Louis by land. Clark, the field captain, continued on with the boat to the Wood River, a few miles above St. Louis, where the party was to assemble in winter quarters. From 12 December 1803 until May 14th the following year, the troops trained in the base camp while the captains spent many days in St. Louis, stocking the expedition and learning what they could about the great unknown western river from the numerous travellers in the town who had information to give.

In the crude frontier settlement, their scientific and medical education apparently continued. A family tradition in the Saugrain-von Phul families of St. Louis has led several historians to investigate the contribution that Dr. Antoine Saugrain may have made to the expedition.[22] Perhaps the most prominent scientist in the Mississippi Valley, Saugrain was a European-trained physician who made the first lucifer matches in the United States and was the first to use cowpox vaccine in the Valley, where he inoculated the Kanawha nation. His thermometers and barometers were made for

21 Thwaites, *op. cit.*, VII, p. 241.

22 Meany, E. S. Doctor Saugrain helped Lewis and Clark. *Wash. hist. Quart.*, 1931, 22, 295-311.

commercial sale and, though the statement is unsupported by any documentary evidence, he is said to have furnished a thermometer, matches, and medicines to Lewis. No thermometer was purchased for the expedition's use by the public stores, yet a thermometer was in use and Pvt. Whitehouse was even sent back to retrieve it one day in 1805 (July 22d) when Lewis left it hanging in the shade,[23] and its later breakage is fully recorded.[24] Portable thermometers were rare instruments in 1803, and Lewis required three in his original lists of scientific instruments and it is entirely possible that one was made for him in Philadelphia. But the family tradition of Dr. Saugrain remains and Lewis' thermometer may well have been made in St. Louis with the mercury scraped from the back of Mrs. Saugrain's best mirror, as the story goes.

In the small camp where the Wood River flows into the Missouri, preparations ended. There was no turning back for supplies, assistance, or further information, spurious or real, about what lay west beyond the Mandans. On May 14th, the small, healthy, well-disciplined party,[25] their admired captains in the lead, shoved off in the small boats and on foot to track the mighty rolling western rivers to the distant sea.

II

As quiet as the gentle rainy spring day on the great flooding Missouri is William Clark's first journal entry for 14 May 1804: "I set out at 4 oClock P.M., in the presence of many of the neighbouring inhabitents, and proceeded on under a jentle brease up the Missouri. . . ."[26]

Meriwether Lewis was in St. Louis on an urgent last-minute business trip and met the party on May 20th at St. Charles. Lewis issued the orders for rations as the party slowly made their way up the broad lower reaches of the muddy river.

> The day after tomorrow lyed corn and grece will be issued to the party, the next day Poark and flour, and the day following indian meal and poark; and in conformity to that rotiene provisions will continue to be issued to the party untill further orders. should any of the messes prefer indian meal to flour they may recieve it accordingly—no poark is to be issued when we have fresh meat on hand.[27]

[23] Thwaites, *op. cit.*, VII, p. 119 (Pvt. Whitehouse's Journal).

[24] *Ibid.*, III, p. 51; VI, pp. 197, 203.

[25] The permanent party initially numbered 34, including Sacagawea, Indian wife of the interpreter, and Clark's slave, York. Sgt. Floyd's death and the discharge of two soldiers lowered the outbound party to 31, later raised to 32 by the birth of Sacagawea's son, and this remained the expedition's numerical strength. See de Voto, B., Ed. *The Journals of Lewis and Clark,* Boston, Houghton Mifflin Co., 1953, pp. 489-491.

[26] De Voto, B., Ed. *The Journals of Lewis and Clark.* Boston, Houghton Mifflin Co., 1953, p. 3.

[27] Thwaites, R. G., Ed. *Original journals of the Lewis and Clark Expedition.* New York, Dodd, Mead, 1904, I, pp. 33-34.

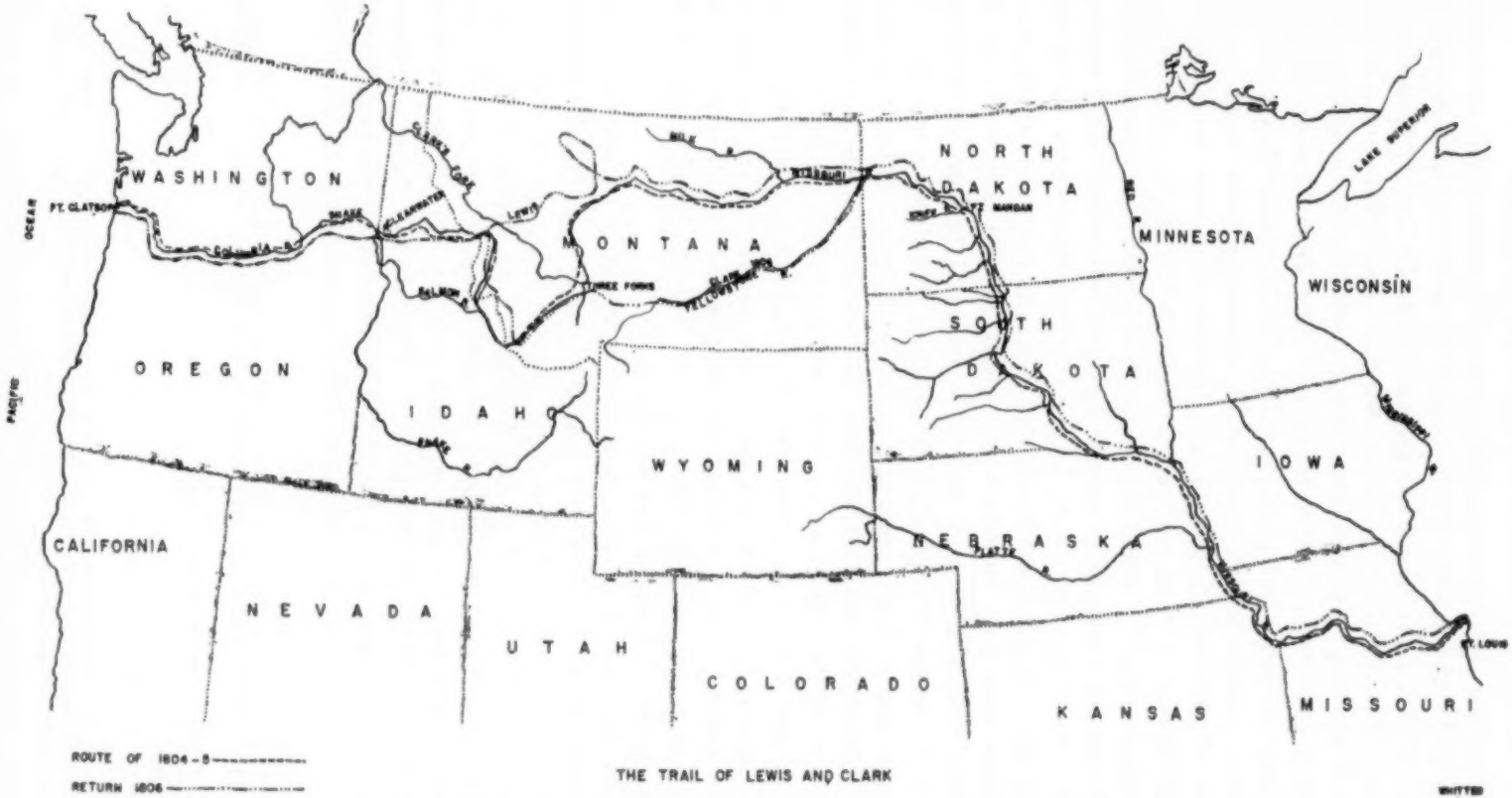

FIG. 5. Sketch map showing the routes of the Lewis and Clark party.

Later, on the upper reaches of the Columbia watershed, when camas roots and poorly dried salmon became the only diet of the Corps of Discovery, this early period would be fondly remembered as one of great luxury. Except for sore eyes from the continual glare of the river and storms of fine dry silt and the grinding physical labor of lifting the laden boats over the continual snags, progress was smooth until Independence Day, 1804, when "Jos Fields got bit by a Snake, which was quickly doctered with Bark by Cap Lewis."[28] Rattlers abounded, and De Voto feels that Joe Fields was bitten by one of these, but one wonders if Lewis' "poultice of bark and gunpowder"[29] would have cured the patient so expeditiously.

A standard treatment of the day is noted several days later by Clark; "one man verry sick, Struck with the Sun, Capt. Lewis bled him & gave Niter which has revived him much."[30] A much graver problem were the "tumers" and "biles" which occurred over the exposed, continually wet skin and produced regional lymphadenitis, often sufficiently painful to keep the men from working. The captains ascribed this disorder to the muddiness of the river water and occasionally were required to resort to more drastic treatment than the usual poultices of elm and cornmeal. Clark notes "I opened the Tumer of a man on the left breast, which discharged half a point."[31] Otherwise Clark was well pleased by the progress of the journey. "It is worthey of observation to mention that our Party has been much healthier on the Voyage than parties of the same number is in any other Situation."[32]

On the 19th of August, however, a major emergency occurred. "Serjeant Floyd is taken very bad all at once with Biliose Chorlick we attempt to relieve him without success as yet, he gets worst and we are much allarmed at his Situation, all attention to him."[33] Floyd, whose brief and pathetic journal is extant, cryptically noted twenty days before, "I am verry Sick and Has ben for Somtime but have Recovered my Helth again."[34] The day following the sudden onset of his illness, which Pvt. Gass recalled as a violent colic,[35] the distressed Clark wrote, "Serjeant Floyd as bad as he can be no pulse

28 Thwaites, *op. cit.*, I, p. 66.

29 Allen, Paul, Ed. *History of the expedition of Captains Lewis and Clark*, 1804-5-6, (Reprint of edition of 1814, with Introduction by J. K. Hosmer). Chicago, A. C. McClurg, I, p. 22.

30 Thwaites, *op. cit.*, I, pp. 69-70.

31 *Ibid.*, I, p. 91.

32 *Ibid.*, I, pp. 85-86.

33 Thwaites, *op. cit.*, I, p. 114.

34 *Ibid.*, VII, p. 22.

35 Gass, P., *Lewis and Clarke's Journal to the Rocky Mountains in the years 1804-5,-6 as related by Patrick Gass, one of the officers in the expedition.* Dayton, Ells, Chaflin, & Co., 1847 (reprint), p. 29.

& nothing will Stay a moment on his Stomach or bowels. Passed two Islands on the S.S. and at the first Bluff on the S.S. Serj. Floyd Died with a great deal of Composure, before his death he Said to me, 'I am going away I want you to write me a letter.' "[36] Pvt. Whitehouse said, "he was layed out in the most decent manner possable."[37] The probability is greatest that young Floyd died a victim of a perforated gangrenous appendix with generalized peritonitis, and the unfortunate sergeant would have fared little better in Philadelphia with Rush and his colleagues in attendance. Buried with military honors above the Big Muddy he had hoped to ascend and explore with his comrades, Floyd was the first American soldier to be buried in the trans-Mississippi West and his name is commemorated by the commanding bluff on which he lies.

The journey up the Missouri to the Mandan villages[38] and the period spent there in winter quarters, 1804, was marked by no other major medical problems following Sgt. Floyd's death. There were minor difficulties with boils, poisoned water, dysentery, and an acute form of rheumatism of the neck and legs. Clark writes of his co-commander's attempt to treat some violent rheumatic pains in his neck: "Capt. applied a hot Stone raped in flannel, which gave me some tempore ease. . . ."[39] The freezing cold added to the problem of keeping the large party occupied with sufficient work, and frostbite became serious on the hunting and wood-cutting details outside the camps. Clark's journal entries on frostbite are a curious mixture of both reticent delicacy and bald chilling statement. He noted "this day being Cold Several men returned a little frostbit. . . . my Servents feet also frosted and his P—s a little,"[40] or "Snowed last night, wind high from NW. Sawed off the boys toes."[41] The latter referred to the frost-bitten feet of a young Indian lad.

Clark tantalizes the medical reader throughout with entries like the following: "one man taken violently Bad with Plurisie, Bleed & apply those remedies Common to that disorder."[42] Lewis, on the other hand, gives us a brief yet full account of the birth of

36 Thwaites, *op. cit.*, I, pp. 114-115.

37 *Ibid.*, VII, p. 51 (Whitehouse's Journal).

38 Near present Staunton, North Dakota, 45 miles north of Bismarck and 1600 river miles from the Wood River.

39 Thwaites, *op. cit.*, I, p. 202.

40 *Ibid.*, I, p. 235.

41 *Ibid.*, I, p. 252.

42 *Ibid.*, I, p. 251.

Sacagawea's first child.[43] The Indian girl's labor (she was probably about sixteen) was "tedious and the pain violent"[44] and Jessaume, an engagé of the Hudson's Bay Co. who interpreted for the captains during their stay with the Mandans, gave her powdered snake rattles in water to hasten her labor. Administered at the last moment, "She had not taken it more than ten minutes before she brought forth."[45] Lewis adds "perhaps this remedy may be worthy of future experiments, but I must confess that I want faith as to it's efficacy."[46]

Venereal disease ("Pox," or primary syphilis) was the principal threat to the party's health in winter quarters at Fort Mandan. Sgt. Gass portentously sums up the situation in his own journal, as follows:

> It may be observed generally that chastity is not very highly esteemed by these people, and that the severe and loathsome effects *of certain French principles* are not uncommon among them. The fact is, that the women are generally considered an article of traffic, and *indulgence* are sold at a very moderate price. As a proof of this I will just mention, that for an old tobacco box, one of our men was granted the honor of passing a night with the daughter of the head chief of the Mandan nation. An old bawd with her punks, may also be found in some of the villages on the Missouri, as well as in the large cities of polished nations."[47]

Lewis had four or five patients continually. He left no precise statement regarding his anti-luetic regimen other than the simple note that he used mercury. Both mercuric ointment and calomel were included in the medical supplies, and one suspects that he followed the accepted method of the day, e.g. a priming dose of calomel and jalap to "clear the bowels" for the subsequent calomel, in pill form, which was given until sore gums appeared, then discontinued. After the soreness cleared, calomel was readministered until the primary lesion disappeared.

The expedition resumed its journey on 7 April 1805, to venture into country quite unknown to Americans or to the English and French traders north of the river. Beyond the Mandans was mystery and pure conjecture mixed with genuine information provided by the Indians, the interpretation of which was difficult to

43 Charbonneau, French engagé, interpreter to the expedition, and Sacagawea's husband, was probably absent, being of little use during any emergency. He was usually saved from embarrassment by his squaw's quick mind and physical agility.

44 Thwaites, *op. cit.*, I, p. 257.

45 *Ibid.*, I, p. 257.

46 *Ibid.*, I, p. 258.

47 Gass, *op. cit.*, p. 72. It should be noted that Gass' journal, the first published record of the expedition (Pittsburgh, 1807) was completely rewritten, edited and expanded by David M'Keehan, a West Virginia school teacher. It is subject to both Gass' later thought and to M'Keehan's editorializing.

master in terms of miles and days. During early May, in the turbulent snow-swollen waters, the white perogue capsized and its goods were lost, or, if recovered, were badly damaged, including many of the medical stores. Little is known about the losses but happily the alcohol was not destroyed: ". . . accordingly fixed our camp and gave each man a small dram. . . . such is the effects of abstaining for some time from the uce of speritous liquors they were all very merry."[48]

At Maria's River, where this wide northern stream rolls into the Missouri, an urgent geographical conference took place and the captains separated to determine which of the unnamed, unknown streams was the Missouri. Clark, on the south fork, came to the decision first that he was following the true Missouri, a conclusion with which Lewis shortly concurred, and on 11 June Lewis and several men left the party to ascend the south fork on foot, Clark remaining to follow with the boats. Before he left, the young captain noted in his journal that Sacagawea was ill and that Clark had bled her. Later in the day, Lewis became quite ill himself with abdominal cramps and fever and, having no medicines, he resorted to a bitter thick black mixture made from the twigs of choke cherry boiled in water. By the following morning, he was completely well. Bakeless, in a biography of the expedition's leaders, relates that Meriwether Lewis' mother was known in Albemarle County, Virginia, as a "yarb doctor" and Lewis had been exposed many times to the preparation and use of such simples.[49]

During Lewis' absence, Clark apparently exhausted his store of information in attempting to treat Sacagawea's illness. Lewis returned in time to take over her care. His description of the sickness sheds considerable light on his knowledge and his abilities as physician-in-chief to his party.

. . . about 2 P.M. I reached the camp found the Indian woman extreemly ill and much reduced by her indisposition. . . . I found that two dozes of barks and opium which I had given her since my arrival had produced an alteration in her pulse for the better/they were now much fuller and more regular. I caused her to drink the mineral water altogether. when I first came down I found that her pulse were scarcely perceptible, very quick frequently irregular and attended with strong nervous symptoms, that of the twitching of the fingers and leaders of the arm/ now the pulse had become regular much fuller and a gentle perspiration had taken place; the nervous symptoms have

[48] Thwaites, *op. cit.*, II, 95.

[49] Bakeless, J. *Lewis and Clark, partners in discovery*. New York, Wm. Morrow and Co., 1947, p. 16.

also in a great measure abated, and she feels herself much freer from pain. she complains principally of the lower region of the abdomen, I therefore continued the cataplasms of barks and laudanum which had been previously used by my friend Capt. Clark. I believe her disorder originated principally from an obstruction of the mensis in consequence of taking could.[50]

Sacagawea recovered rapidly, undoubtedly in spite of the somewhat rigorous measures adopted by the captains. Lewis' rather liberal use of opiates helped ease the pain of her acute illness, the total duration of which was six days. Pelvic pain, fever, rapid thready pulse, and menstrual irregularity in a young woman under such circumstances seems most strongly to suggest acute pelvic inflammatory disease, either recently acquired or an exacerbation of a chronic infection. Sacagawea may also, though less likely, have been suffering with an acute exacerbation of latent post-partum infection or from appendicitis. It is regrettable that the account of her illness is so sketchy, but any diagnostic conjectures should be tempered by the fact that this was the only recorded serious ailment Sacagawea suffered during the entire journey.

At Great Falls, Montana, a series of tremendous cataracts ten miles long, made river travel impossible and the party spent an entire month portaging boats and goods on crude wagons to the upper river under Clark's direction, while Lewis, in the upper camp, supervised the setting-up of the iron boat and acted as cook to his own command. His failure to float the iron boat more than momentarily before its covering of larded and tarred skins leaked or completely parted was apparently one of the least of the disappointments. Clark notes "to state the fatigues of this party would take up more the journal than other notes which I find scercely time to set down."[51] Of trouble, distractions and irritations, there were many and Lewis rather floridly wrote: "our trio of pests still invade and obstruct us on all occasions, these are the Musquetoes eye knats and prickley pears, equal to any three curses that every poor Egypt laiboured under, except the Mahometant yoke."[52] Despite Egypt's burdens, little worse happened during the month of back-breaking labor than the following incident which Pvt. Whitehouse related in his own journal, "I took sick this evening I expect by drinking too much water when I was hot. I get bled &c."[53] Lewis found his pulse full and apologizes for the want of any instru-

50 Thwaites, *op. cit.*, II, pp. 162-164.
51 *Ibid.*, II, p. 183.
52 Thwaites, *op. cit.*, II, p. 266.
53 *Ibid.*, VII, p. 108 (Whitehouse's Journal).

ment other than his penknife but notes that, for venesection, "it answered very well."[54]

On 27 July the expedition reached the forks of the Missouri, where Clark, a natural geographer of genius, rightly decided they must ascend the most western of the three converging streams, which they named the Jefferson River, to reach the western mountains. At this point, they were almost exactly 2,500 miles from the mouth of the great river and had now traversed its entire length. Though still exhausted from the arduous portage, the party was very well, but Clark soon fell ill with constipation and aggravated it by continuing his explorations of the other forks of the river. Lewis records: "Cap.t C. thought himself somewhat bilious and had not had a passage for several days; I prevailed on him to take a doze of Rushes pills, which I have always found sovereign in such cases and to bath his feet in warm water and rest himself."[55] Lewis' knowledge of Rush's famed remedy was probably better than Clark's notion of the recommended dose, since he enthusiastically took five of the pills at once and recorded no ill effects from this total dosage of, presumably, over 3 grams each of calomel and jalap. It was the last illness of sufficient note to be recorded in the journals until the explorers began their winter encampment at the mouth of the Columbia.

A long land and water trek led the party through the Rockies from the headwaters of the Jefferson by somewhat devious route over the Lemhi, Gibbon's, and Lolo Passes to the Clearwater River. Here, close to the site of modern Missoula, Montana, the log canoes were built which carried the party into the great Columbia and out to the Pacific. Food presented the primary problem, and shortly the situation became extremely serious. Game was very scarce and poor in quality when available, and the expedition's own food stores were badly reduced. The Indian diet became the party's staple and proved both monotonous and debilitating, consisting entirely of edible roots[56] and dried salmon, with occasional wild game or an equally poor dog purchased from the Indians. Diar-

[54] *Ibid.*, II, p. 189.

[55] Thwaites, *op. cit.*, II, p. 279.

[56] A variety of these roots and bulbs were used by the Indians, usually made into a gruel or pounded and dried to form a bread. Those mentioned prominently in the journals included camas (*Camassia quamash*), wapato (*Sagittaria latifolia*), and cows or biscuitroot (*Lomatium geyeri*). Probably others were the Indian potato, the cattails, and bitterroot (*Lewisia rediviva*). L. H. Pammell (*A manual of poisonous plants*, Cedar Rapids, Iowa, Torch Press, 1911) has pointed out the long-term severe nutritional disturbances which result from a continual diet of these otherwise nontoxic plants. Utilizable carbohydrate is low and many contain high concentrations of nonmetabolized starches like inulin.

rhea, the low caloric intake, and absence of salt balanced poorly against the hard labor of frequent portaging, and the party found itself poorly prepared for the extreme privations of winter quarters on the low tidelands of the great river. Near-starvation and gloomy weather were unable to stifle the exultant Clark, who, speaking for the entire party, jotted quickly in his notebook on courses and bearings one of the truly unforgettable lines in the literature of exploration: "*Ocian in view-* O! the joy."[57]

Their camp at the mouth of the Columbia, Fort Clatsop, was cold and almost continuously rainy (and its appearance today is no less dismal than 150 years ago). The leather-clad explorers were hardly ever dry or warm, and colds, pleurisy, and severe rheumatism became serious and recurrent complaints. Both Clark and Lewis remained relatively well and bent all their efforts to provide both salt and meat for their weakened command. Four thousand miles of return travel still faced the party, and the store of Indian presents was almost completely gone so that bartering was reduced in order to provide only the most necessary items, and the impoverished thieving Chinooks could produce even few of these. Moreover, trading on their knowledge of white men, the Indians soon started another type of enterprise.

> An old woman & Wife to a Cheif of the *Chunnooks* came and made a camp near ours. She brought with her 6 young Squars (her daughters & nieces) I believe for the purpose of Gratifying the passions of the men of our party and receiving for those indulgiences Such Small as She (the old woman) thought proper to accept of.
>
> Those people appear to View Sensuality as a Necessary evel, and do not appear to abhor it as a Crime in the unmarried State. The young females are fond of the attention of our men and appear to meet the sincere approbation of the friends and connections for thus obtaining their favours.[58]

Clark's patience was soon stretched to the utmost as we gather from his exasperated "The Chin-nook womin are lude and carry on sport publickly."[59] The captains treated two men with mercury for almost three months. Lewis learned that the Indians had no specifics against the venereal diseases and that lues always lead to decrepitude, death, or premature aging, but he felt that the simples of lobelia and sumac he had seen used by the handsome and intelligent

[57] De Voto, *op. cit.*, p. 279.

[58] Thwaites, *op. cit.*, III, p. 241. Robert Gray's discovery of the great river in 1792 in his American ship, the Columbia, had given the Indian Communities ample opportunity to learn how best to capitalize on the needs and weaknesses of white exploring parties. Clark, after describing at length the physical attributes of what he obviously felt were singularly unattractive women, noted a tattoo reading "J. Bowman" on the left arm of one of the maidens in this speedily assembled commercial enterprise.

[59] *Ibid.*, III, p. 294.

Chippewas of the Great Plains were both "effecatious and sovereign" for both lues and gonorrhea.[60]

While a trio of the men set up a salt-making plant and successfully produced nearly a gallon of salt per day, the continual cold rain and fog began to take serious toll. Pvt. Bratton had to be relieved at the salt works because of very severe low back pain. Though many of the men suffered with various rheumatic complaints, Bratton remained seriously incapacitated until late in May, almost four months. Treated symptomatically with barks, laudanum and "some volatile linniment which was prepared with sperits of wine, camphire, castile soap, and a little laudinum," Bratton improved gradually, regaining appetite and strength, but with too much lumbar pain to be a working member of the party.

Speed was absolutely essential in retracing their course[61] because the Indians on the lower Columbia passed on to the captains a rumor that the friendly Choppunish tribes (Nez Percés), who were boarding their horses, were leaving early for the Rockies. The expedition's Indian goods were now dissipated almost completely by trade with canny natives. Most of the gifts the party could use now would be items of their own personal equipment. Lewis knew that the essential boats and horses would take what trinkets were left and the party must find some expedient to increase their purchasing power. The solution was a relatively simple one, an exchange of goods and horses for medical attention. At first, neither Lewis nor Clark recognized that their fame as physicians had filtered down into the Columbia basin from the Nez Percé tribes nor did it occur to them that they might turn this reputation into something tangible. Clark, practical as ever, made the first attempt.

> I saw a man who had his knee contracted who had previously applyed to me for some medisene, that if he would fournish another canoe I would give him some medisene. He readily consented and went himself with his canoe by means of which he passed our horses over the river safely and hubbled them as usial . . . they [Walla-Wallas] brought several disordered persons to us for whome they requested some medical aid. one had his knee contracted by the Rhumitism (whome is just mentioned above) another with a broken arm &c. to all of whome we administered much to the gratification of those pore wretches, we gave them eye water which I believe will render them more essential sirvice than an other article in the medical way which we had it in our power to bestow on them. . . . The man who had his arm broken

[60] *Ibid.*, IV, p. 16.

[61] Jefferson's failure to provide a ship to relieve the party on the Columbia has never been explained, and the party saw no ships during their stay.

had it losely bound in a piece of lether without anything to support it. I dressed the arm which was broken short above the wrist & supported with broad sticks to keep it in place, but [?] in a sling and furnished him with some lint bandages &c. to Dress it in future.[62]

Clark was both more interested and more comfortable with Indians than the introspective and more fastidious Lewis. "My friend Capt. C. is their favorite physician," Lewis wrote, "and has already received many applications. in our present situation I think it pardonable to continue this deseption for they will not give us any provision without compensation in merchandize and our stock is now reduced to a mere handfull. We take care to give them no article which can possibly injure them."[63]

Their practice, assiduously fostered over the entire return route to the Rockies, became large and, on the whole, Clark, with Lewis' advice, provided better care than many of the tribes were to know again until quite recent times. A selection from the captain's notes gives the reader some idea of the problems the frontier physicians faced.

Several applyed to me today for medical aide, one a broken arm another inward fevers and several with pains across the loins, and sore eyes. I administered as well as I could to all. in the evening a man brought his wife and a horse both up to me. the horse he gave me as a present and his wife who was verry unwell the effects of violent coalds was placed before me. I did not think her case a bad one and gave such medesene as would keep her body open and raped her in flannel. left some simple medesin to be taken. we also gave some Eye water 1 G [?] of Ela v V. & 2 grs. of Sacch^{m} S^{tr} to an ounce of water and in that perportion. . . .[64]

At 11 A.M. Thompson returned from the village accompanyed by a train of invalids consisting of 4 men 8 women and a child. The men had soar eyes and the women in addition to soar eyes had a variety of other complaints principally rheumatic; a weakness and pain in the loins is a common complaint with their women. eyewater was administered to all; to two of the women cathartics were given, to a third who appeared much dejected and who from their account of her disease we supposed it to be histerical, we gave 30 drops of Laudanum. the several parts of the others where the rheumatic pains were seated were well rubed with volitile linniment. all of those poor wretches thought themselves much benefited, and all returned to their vilage well satisfyed.[65]

62 Thwaites, *op. cit.*, IV, pp. 333-334.

63 *Ibid.*, IV, p. 358.

64 Thwaites, *op. cit.*, IV, pp. 339-340 (p. 340). Deciphered, the collyrium contained, per ounce of water, 2 grains of lead acetate and 1 grain of zinc sulfate. "Ela" is a corruption of calamine ($ZnCO_3$) and V. probably represents an abbreviation of vitriol. *Calaminae vitriolum* or zinc sulfate was made by dissolving calamine in sulfuric acid or oil of vitriol. The small "v" possibly refers to an impure, "venale," grade of zinc sulfate. This mildly astringent solution was so successful in treating the conjunctivities Lewis and Clark found so commonly that it became their most successful trade item. A vial of eye water was traded for a good horse. Blindness, undoubtedly due to trachoma and venereal disease, was very commonly observed by the explorers, but is distinguished carefully in the journals from the prevalent "soar eyes" which afflicted both Indian and explorer.

65 Thwaites, *op. cit.*, V, p. 49.

Their satisfaction was all the Americans, impatient to be on their way, could hope for, though neither Clark nor Lewis allowed themselves to be deceived as to the lasting value of their therapy. Charbonneau's infant, the bright-eyed Pompey, who was Clark's favorite, developed a severe sore throat and cervical lymphadenitis which was carefully poulticed with wild onions and the youngster subjected to the usual purgative regimen.[66] He recovered rapidly and only one serious problem remained to be solved before the party could leave the camps on the Clearwater for the mountains. William Bratton, his appetite good and his weight recovered, was still so crippled by the rheumatic stiffness and pain in his back that he could neither ride horseback nor walk with any comfort. The worried Lewis notes "we have tried every remidy which our engenuity could devise, or with which our stock of medicines furnished us, without effect. John Sheilds observed that he had seen men in a similar situation restored by violent sweats. Bratton requested that he might be sweated in the manner proposed by Sheilds to which we consented."[67] Bratton was sweated for an hour in an improvised Indian steam bath, which consisted of a large pit previously heated by a roaring fire before the naked victim was lowered into it. Comfortably seated under a heavy blanket "orning," Bratton sprinkled water over the hot stones for steam and was interrupted twice when his companions took him out and dunked him briefly in the icy Clearwater. Shields gave him a strong tea of horsemint, having no snakeroot which he had seen used before. The treatment was remarkably successful and in the following week, Bratton went on a trading party, his first activity in four months.

Bratton's illness remains mysterious. Initially relieved at the salt plant because he was "verry unwell" (?), he remained extremely weak and may have suffered a severe gastroenteritis. The onset of low back pain occurred early in the course of the disease, probably within the first three days and it remained after the other symptoms had disappeared. There is no description of colic, diarrhea or vomiting and the young man had been healthy previously. Bratton outlived many other members of the expedition, dying at about sixty years of age after a busy and useful life. It is not known if he suffered a recurrence of his complaint. With only the meager descriptions of his long illness and his dramatic recovery in the daily

[66] *Ibid.*, V, p. 56.
[67] *Ibid.*, V, pp. 60-61.

diaries of the expedition, Bratton may well have had an infectious arthritis initially related to bacterial gastroenteritis, whose resolution may have been complicated by constant dampness, cold, and the necessity of wearing wet leather clothing continually.

The party, once through the Bitter Root range, divided, Lewis to go directly to the portage at Great Falls by a direct route and explore Maria's River, Clark to explore the Jefferson as far as the Three Forks and then to go overland to the Yellowstone, where the captains would rendezvous. Clark's journey was extremely easy, but the last serious accident of the expedition plagued Lewis and his party. Cautiously stalking an elk in the company of the one-eyed boatman, Cruzatte, Lewis writes:

I was in the act of firing on the Elk a second time when a ball struck my left thye about an inch below my hip joint, missing the bone it passed through my left thye and cut the thickness of the bullet across the hinder part of the right thye; the stroke was very severe . . . with the assistance of Serg[t] Gass I took off my cloaths and dressed my wounds myself as well as I could, introducing tents of patent lint into the ball holes, the wounds blead considerably but I was hapy to find that it had touch neither bone nor artery . . . as it was painfull to me to be removed I slept on board the perogue; the pain I experienced excited a high fever and I had a very uncomfortable night."[68]

The following day, the entire party was reunited below the mouth of the Yellowstone, as related by Clark, who now took over the journal entries entirely.

"I was alarmed" he wrote, "on the landing of the canoes to be informed that Capt. Lewis was wounded by accident. I found him lying in the Perogue, he informed me that his wound was slight and would be well in 20 or 30 days. this information relieved me very much. I examined the wound and found it a very bad flesh wound The ball had passed through the fleshey part of his left thy below the hip bone and cut the cheek of the right buttock for 3 inches in length and the debth of the ball."[69]

As Lewis had accurately predicted, 25 days later Clark was able to note that "My worthy friend Cap Lewis has entirely recovered his wounds are heeled up and he can walk and even run nearly as well as ever he could, the parts are yet tender &c &c."[70]

Thirteen days later, a jubilant company of hardy young men who had gone by land and water to the western ocean and returned, tied up at St. Louis. They had been gone 27 months and travelled 8,000 miles by boat, horseback, and on foot. They returned to the adulation of their countrymen and the fascination of all Americans

68 Thwaites, *op. cit.*, V, pp. 240-242.
69 *Ibid.*, V, p. 330.
70 *Ibid.*, V, p. 380.

and Europeans who would follow their epic journey in the pages of the printed journals.

The Lewis and Clark party survived dysentery, malaria, poisonous waters, long periods of semi-starvation, and bitter weather, countless superficial wounds and injuries. Much credit is due their youthful vigor and strength, to the absence of the settlements of the next half-century which would seed the plains and rivers with cholera and the other epidemic diseases of great land migrations, and to the friendliness or confusion of the Indians who claimed none of them. But most credit is due to the unusual vigilance and care exercised by commanders who, in addition to the skills of leadership and practical scientific observation, were often more medically knowledgeable than might have been expected. Indeed, the active practice of medicine, somewhat embarrassing to Lewis, the instinctive physician, but enthusiastically handled by Clark, the more practical field surgeon, undoubtedly eased the party's return journey. The medicine which made allies of the Western tribes was truly medicine rather than the possession of deadly weapons, and the Indians would wait for another thirty years or more for the missionaries to return with medical supplies for such use.

Undoubtedly Lewis and Clark possessed not only extraordinary common sense but also the medical knowledge common to most educated men of the time, particularly to those who had served as military officers and had seen military physicians at work. The therapeutic armamentarium was pitifully small, but its very smallness was an advantage in that its essentials were moderately easy to learn. And to supplement their commonly shared information, the captains could rely on a well-assembled stock of medical supplies, a page of specific, written instructions for the care of their health and undoubtedly other advice given Lewis privately by the ex-officio medical counselor to the expedition, Benj: Rush.

Dr. Samuel Johnson's Medical Biographies

LAWRENCE C. McHENRY, JR*

SAMUEL Johnson was a "great dabbler in physick." His own illnesses were aptly and vividly described in his writings,[15] and over thirty physicians have written about him from the eighteenth century to the present. Although Johnson's physical and mental ailments have been discussed from varying points of view, and his acquaintance with many contemporary physicians and "physick" has been brought out, his eighteen medical biographies have received little attention.[1, 6, 7, 22] Since these biographies of physicians have not hitherto been considered as a single endeavour in medical biography nor previously brought together for the scrutiny and pleasure of physicians and scholars, it is the purpose of this paper to do so, and to inquire further into the nature of a man so well known and so often quoted.

James Boswell[2] was not the first to mention Dr. Johnson's biographies of physicians. Several were reprinted in Davies' *Miscellaneous & Fugitive Pieces* in 1777, and they were mentioned in earlier biographies of Johnson.[18] Johnson acknowledged his biographies of Boerhaave, Sydenham, and Sir Thomas Browne, and Boswell also claimed for him the life of Morin. *Lives of the English Poets* contains the biographies of Drs. Cowley, Garth, Blackmore, and Akenside. Nothing was known, however, of Johnson's other medical biographies until the late 1930's, when Allen T. Hazen[7] established as his the lives of Actuarius, Aegineta, Aesculapius, Aetius, Aretaeus, Archagathus, Asclepiades, Alexander, Tournefort (a botanist), and Ruysch in Volume I of Robert James's *Medicinal Dictionary*. All the biographies except Browne's and those in the *Lives* were written between 1739 and 1743, a period when Johnson (aged 30 to 34 years) was just beginning his literary career in London.

Dr. Johnson, while in the Hebrides with Boswell, told him that "he did not think that the life of any literary man in England had been well written. Besides the common incidents of life, it should tell us his studies, his mode of living, the means by which he attained to excellence, and his opinion of his own works."[2] On another occasion he said:

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> . . . biography has often been allotted to writers, who seem very little acquainted with the nature of their task, or very negligent about the performance. They rarely afford any other account than might be collected from publick papers, but imagine themselves writing a life, when they exhibit a chronological series of actions and perferments; and have so little regard to the manners or behaviour of their heroes, that more knowledge may be gained of a man's real character, by a short conversation with one of his servants, than from a formal and studied narrative, begun with his pedigree, and ended with his funeral.[2]

In spite of his harsh criticism, he went on to write many biographies. His method was frequently based on translating or compiling from other authors. His biography of Boerhaave is from a eulogy by Albert Schultens, and the one of Morin from a panegyric by Fontenelle; his biographies in James's *Dictionary* are mostly from Le Clerc's and Freind's histories of medicine.[4,17]

Robert James's *Medicinal Dictionary*

The biographies in James's *Dictionary,* published in 1743, have only been public knowledge for a little over 20 years. Hazen[7] first demonstrated the similarity in writing between certain lives in James's *Dictionary* and Johnson's style. He noted the similarities between the original biographies and Johnson's compositions, emphasizing the additions to the original. He considered the interspaced comments and elaborations as typically Johnsonian.

In the *Proposals* for the *Dictionary* issued in 1741, Johnson mentioned writing biographies. He wrote:

> As an inquiry after those who have contributed to our advantage, is not only the consequence of a natural curiosity, but of a laudable gratitude, the *History of Physicians,* being an account of the lives, writings, and characters of the principal authors in physic, will be inserted in the work as their names occur in the alphabet.[8]

Johnson told Boswell, "my knowledge of physick I learnt from Dr. James, whom I helped in writing the proposals for his *Dictionary* and also a little in the *Dictionary* itself." Boswell continues, "Johnson, as I understand from him, had written, or assisted in writing, the proposals for this work; and being very fond of the study of physick, in which James was his master, he furnished some of the articles," but "I have in vain endeavoured to find out what part Johnson wrote for Dr. James. Perhaps medical men may."[2]

In the *Preface* to his *Dictionary* James gives us a list of biographies.

> The lives of ancient physicians have swelled the letter A considerably; and this was not to be avoided, unless I could have changed their names, or omitted them, contrary to the promise I made in my Proposals; for it

happened, that most of their names whom I judged it necessary to give some account of, occurred in the letter A. Instances of this are Actuarius, Aegineta, Aesculapius, Aetius, Aretaeus, Albucasis, Avicenna, Averroes, Avenzoar, Archagathus, Asclepiades, and some others. As I have given the life of Ruysch under Anatome, together with accounts of the other anatomists; under Botany, a detail of the physicians celebrated for their knowledge of this science; and under Chemia, taken notice of the chemists omitted in the Preface; the lives of very few physicians will occur in the remainder of the work.[10]

Hazen wondered whether "Dr. James has here given a special list of Johnson's articles," but he goes on to point out that the lives of Albucasis, Avicenna, Averroes, and Avenzoar are taken directly from Freind.

Most of Johnson's ten biographies in Volume I of James's *Dictionary* are of Greek or Byzantine physicians, whose writings consist of compilations of previous authors. The remarks quoted below are from three of the biographies. ALEXANDER OF THRALES (Sixth Century A.D.) was the first to recommend colchicum in the treatment of gout. Johnson writes of his later attraction to mysticism:

It is useless either to inquire into the reasons of this depravation of Alexander's understanding, or to extenuate his error, by enumerating the learned and wise men that have been misled by superstition. The causes of error are innumerable, and therefore cannot be particularly pointed out, and to produce testimonies in favour of folly, is at least to contribute very little to its extirpation.[10]

Speaking of the writings of ASCLEPIADES OF BITHYNIA (First Century B.C.), who was a pioneer in the humane treatment of the insane, Johnson says:

Though Asclepiades might not possibly have been a model for the direction of practice, yet there would have been a certain pleasure in reading his works, since 'tis to be presumed they were beautifully written; and if they had not been a standard for physicians, they would have, at least, proved an amusement for philosophers. . . .[10]

AETIUS OF AMIDA (Sixth Century A.D.), royal physician to Justinian I, compiled extensive works on surgery, gynecology, and obstetrics. In comparing Aetius's works with Galen's, Johnson observes:

On these accounts, perhaps, it will be thought inferior to the forementioned epitome of Galen's works. But, to speak my mind freely, in this negligent age, which minds nothing less than the sick, I would recommend this collection above all other works of that kind, especially to those who do not care to search into the depth of theory of medicines, but have the health of mankind more at heart.[10]

Fig. 1. Dr. Samuel Johnson, from the portrait by O. Humphrey, 1773. (Reproduced through the kindness of Herman W. Liebert.)

Hazen is not completely certain about the authenticity of the biographies of Aetius or Aesculapius, which are two of the three longest biographies. These biographies, however, certainly contain sections which would point to their being the work of Johnson.

Hazen quotes from the remaining biographies; hence these will not be elaborated on, but only briefly mentioned.[7] ARCHAGATHUS (Second Century B.C.) was the first Greek physician to go to Rome at a time when Rome was medically backward. AESCULAPIUS was the legendary Greek god and son of Apollo. Johnson's lengthy biography taken from Le Clerc[17] gives a good history of the Aesculapian cult and temples. JOHANNES ACTUARIUS (Thirteenth Century A.D.) wrote the most complete treatise to that period on urine. PAUL OF AEGINETA (Seventh Century A.D.) was a Greek eclectic who accurately described the great bulk of ancient medicine. He gave original descriptions of paracentesis and mastectomy. ARETAEUS THE CAPPADOCIAN (First Century A.D.), in Garrison's opinion, ranks next to Hippocrates in his graphic accuracy in describing diseases. He gave classic accounts of the aura in epilepsy, and differentiates between cerebral and spinal paralysis indicating the pyramidal decussation. A first edition of his works was found in Johnson's library.

There are about 175 biographies of varying length under the section on Anatomy in Volume I. These include William Harvey and Galen which are interesting and well written but do not seem to be Johnson's. Only one biography, that of Ruysch, bears any resemblance to Johnson's style. FREDERICK RUYSCH (1638-1731),[6] a noted Dutch anatomist, was the first to demonstrate the valves of lymphatics and inject the blood vessels with wax. His picture is familiar in the anatomy paintings of the eighteenth century Dutch artists. Ruysch

> . . . was none of those superficial inquirers, who either through prejudice, or indolence, rest satisfied on this side of truth; for he had stripped his mind of all those unreasonable attachments, which are inconsistent with the temper of a philosopher; and acquired such an indefatigable turn, that his hardest labours in pursuit of truth became his highest pleasures, and his only recreations.[10]

The remaining biography in Volume I is the life of HERMAN BOERHAAVE[10] (1668-1738). This was first published in the *Gentleman's Magazine*[12] in 1739, and in 1743 appeared in an expanded form in James's *Dictionary*. It was republished in 1752 in the *Universal Magazine*.[13] The fact that Boerhaave's life appeared twice in 13 years in popular London magazines gives some indication of his

fame. He was born the last day of 1668 in a village two miles from Leyden, Holland. He "was always designed by his father for the ministry," but "his propension to the study of physic grew too violent to be resisted," and he received his "Doctor in Physic" in 1693. He was more than well founded in the fields of theology, philosophy, chemistry, and botany. He began practising and teaching at the University, and "was one of those mighty capacities to whom scarce anything appears impossible, and who think nothing worthy of their efforts but what appears insurmountable to common understandings." Garrison[5] says that he is to be remembered primarily as a bedside teacher and clinical instructor. He was the greatest consultant of his times, and his pupils had a marked influence at the University of Edinburgh and in turn on the early American medical schools. His writings were translated into all European languages and Chinese and Hebrew. Johnson says of them:

> I must here observe, that Boerhaave, to his great honour, seems to have gone counter to most writers of institutes, and compilers of systems. For they have generally endeavoured to lead Nature as it were captive, and make her act conformable to their preconceived notions, however crude and chimerical; imposing laws upon the animal economy, which have no reality, and establishing with great pains and industry, sources of action which exist nowhere but in their own imaginations. Boerhaave, on the contrary, was convinced by daily experience, and a fund of good sense, that the Greek physicians by diligent observation had determined with great accuracy, how nature acts in producing the symptoms of distempers, and her methods of relieving her herself, either with or without the assistance of art; and that their experience had furnished them with very successful methods of cure.[10]

A typical Johnsonian reflection comparing Boerhaave to the rest of mankind is that:

> Men are generally idle, and ready to satisfy themselves, and intimidate the industry of others, by calling that impossible which is only difficult.[10]

Osler paraphrases the following in concluding his address, "Books and Men:"[21]

> It is, I believe, a very just observation, that men's ambition is generally proportioned to their capacity. Providence seldom sends any into the world with an inclination to attempt great things, who have not abilities likewise to perform them.[10, 21]

In Volume II of James's *Dictionary,* I can find biographies only of Galen and Hippocrates. Neither of these appears to be by Johnson. The section on chemistry contains merely several short biographical sketches of no particular significance. The section on botany contains a history of the subject but the only full biography is Johnson's life of Tournefort. In Volume III of the *Dictionary,*

however, there is a biography, hitherto unmentioned, which may possibly have been composed by Johnson. The attribution is tentatively advanced for the consideration of other Johnsonians.

ORIBASIUS (Fourth Century A.D.), according to Garrison, was a torchbearer of knowledge rather than an original writer. He compiled and quoted exactly from his predecessors, and it is through him that much of our knowledge of certain ancient authors is known. He gives a very clear-cut description of the signs of lesions at various levels of the spinal cord. The biography begins with two paragraphs taken directly from Freind's *History of Physick*.[4] The third paragraph is not from Freind, and has some resemblance to Johnson's style.

> Dr. Freind observes, that Oribasius uses a great variety of expression, of which we have this advantage, that often one place or one author, explains another; and this justice ought to be done to him, that he helps us the better to understand several passages in Galen, relating both to anatomy and medicine. He was, by all accounts, a man, not only of a great genius, but of great business and experience; And, accordingly, if we pursue him with attention, which, I believe, has scarce ever been done by those who have pretended to give a character of him, we shall find very just rules of practice laid down in several cases.[10]

The remainder of the biography is an elaboration of Oribasius' works.

The only other biography in Volume III is a short note on Nicolaus Myrepsus which does not seem to be Johnson's. Johnson limited all of his biographies to the first volume, except possibly the biography of Oribasius, primarily because most of the biographies, as James mentioned, are in Volume I. If there are other nonbiographical sections in James's *Dictionary* by Johnson, they have yet to be uncovered.

LIVES OF THE ENGLISH POETS

Lives of the English Poets,[16] the best known of Johnson's books, was published from 1779-1781. Begun in 1777, when Johnson was 68 years old, this work contains 52 short biographies and criticisms of English poets who lived during the seventeenth and eighteenth centuries. Four of these poets were physicians of varying ability. The *Lives* is still read today, and has remained, by its own merit, Johnson's most popular work.

SIR SAMUEL GARTH[16] (1661-1718) is remembered for his poem, *The Dispensary*, which expressed the cause of several London physicians who were trying to establish an out-patient department for

the poor of the city. Garth also saved the poet, John Dryden, from an ignominious burial by reading an ovation at his funeral which was held in the hall of the College of Physicians. In his biography of Garth Johnson praises physicians with the following:

> Whether what Temple says be true, that physicians have had more learning than the other faculties, I will not stay to enquire; but I believe every man has found in physicians great liberality and dignity of sentiment, very prompt effusion of beneficence, and willingness to exert a lucrative art where there is no hope of lucre.[16]

MARK AKENSIDE[16] (1721-1770), like Garth, was first and foremost a physician, a poet by whim or interest. Born a butcher's son, he was sent to Edinburgh at 18 to study for the ministry; his determination to study medicine, however, led him to Leyden in 1741. He received his doctor's degree in 1744 on the publication of his thesis, *"The Original and Growth of the Human Foetus,* in which he is said to have departed, with great judgement, from the opinion then established, and to have delivered that which has been since confirmed and received." Akenside finally settled in London to practise, and on this Johnson notes:

> A physician in a great city seems to be the mere plaything of Fortune; his degree of reputation is, for the most part, totally casual: they that employ him, know not his excellence: they that reject him know not his deficience. By an acute observer, who had looked on the transactions of the medical world for half a century, a very curious book might be written on the Fortunes of Physicians.[16]

"A lover of contradiction, and no friend of anything established," Akenside nevertheless became a member of the College of Physicians, a Fellow of the Royal Society, and a Physician to St. Thomas's Hospital. His *Discourse on Dysentery* "entitled him to the same height of place among the scholars as he possessed before among wits [for his poetry]." He "was one of those poets who have felt very early the motions of genius," and at the age of 23 published his one great work, *The Pleasures of the Imagination,* a long poem in blank verse.

The life of ABRAHAM COWLEY[16] (1618-1667) is the first in the *Lives,* and Johnson "considered it as the best of the whole." Cowley published a volume of verse by the time he was 13, and became more of a poet than a physician. During the Great Rebellion (1642-1649) for political reasons "he then took upon himself the character of a physician," and "complying with the men then in power, he obtained an order to be created Doctor of Physic." In

spite of his ill-obtained title, "a doctor of physic, however, he was made at Oxford, in December 1657; and in the commencement of the Royal Society he appears busy among the experimental philosophers with the title of Doctor Cowley. There is no reason for supposing that he ever attempted practice; but his preparatory studies have contributed some to the honour of his country." The nature of the preparatory studies was not mentioned, but they were probably for his degree.

SIR RICHARD BLACKMORE[16] (1654-1729), according to Johnson, was noted more for his poetry than his medicine and achieved more notoriety than fame. He "is one of those men whose writings have attracted much notice," and "whose lot it has been to be much oftener mentioned by enemies than by friends." He was educated at Oxford and "at Padua he was made doctor of physick."

> When he first engaged in the study of physic he enquired, as he says, of Dr. Sydenham what authors he should read, and was directed by Sydenham to *Don Quixote;* "which," said he, "is a very good book; I read it still."[16]

Johnson observes on this:

> The perverseness of mankind makes it often mischievous in men of eminence to give way to merriment. The idle and the illiterate will long shelter themselves under this foolish apophthegm.[16]

Blackmore went into practice in Cheapside in London, and he "was made a poet not by necessity but inclination, and wrote not for a livelihood but for fame." His poems were popular, but he was attacked violently by the critics.

> Contempt is a kind of gangrene, which, if it seizes one part of a character, corrupts all the rest by degrees. Blackmore, being despised as a poet, was in time neglected as a physician: his practice which was once invidiously great, forsook him in the latter part of his life; but being by nature or by principle averse from idleness he employed his unwelcome leizure in writing books on physick, and teaching others to cure those whom he could himself cure no longer. I know not whether I can enumerate all the treatises by which he has endeavoured to diffuse the art of healing; for there is scarcely any distemper of dreadful name, which he has not taught his readers how to oppose . . . I have been told that there is something in them [his treatises] of vexation and discontent, discovered by a perpetual attempt to degrade physick from its sublimity, and to represent it as attainable without much previous or concomitant learning.[16]

The remaining biographies are of Sir Thomas Browne, Louis Morin, and Thomas Sydenham which were published separately.

The life of SIR THOMAS BROWNE[3] (1605-1682) was written for the second edition, 1756, of Browne's *Christian Morals* because "an

edition of a posthumous work appears imperfect and neglected without some account of the author." Boswell considers this one of Johnson's best biographical performances. Browne was born in London, was graduated from Pembroke College, Oxford, and received his doctor's degree from Leyden in 1633. Although he practised for 46 years in Norwich, Browne is renowned more for his writings than his physick. His *Religio Medici* was a favorite work of Osler's, who described it as "an attempt to combine daring skepticism with humble faith in Christian religion."[20] It has been stated that Johnson's style of writing imitated and was influenced by Browne's. The life and writings of Browne have been scrutinized more than Johnson's other subjects and a recent review of Johnson's life of Browne, by Wagley and Wagley,[24] brings out the highlights of this biography. They aptly quote Johnson's comments on Browne's writings:

> . . . it is not on the praises of others, but on his own writings that he is to depend for the esteem of posterity; of which he will not easily be deprived, while learning shall have any reverence among men: for there is no science, in which he does not discover some skill; and scarce any kind of knowledge, profane or sacred, abstruse or elegant, which he does not appear to have cultivated with success.[3]

The life of LOUIS MORIN[11] (1635-1714), which appeared in the *Gentleman's Magazine* in 1741, was accepted on internal evidence by Boswell as Johnson's. Morin, a French physician and botanist, probably attracted Johnson's attention because of his piety. Morin rose slowly in the profession, for "mere unassisted merit advances slowly, if, what is very common, it advances at all." He achieved no lasting fame, but during his later years was well known as a practitioner in Paris. When Dr. Tournefort named a plant after Morin, Johnson commented that:

> These are compliments proper to be made by the botanists, not only to those of their own rank, but to the greatest persons; for a plant is a monument of a more durable nature than a medal or an obelisk.[11]

The remaining biography is that of THOMAS SYDENHAM[14] (1624-1689) which appeared in the *Gentleman's Magazine* in 1742 and was prefixed to the 1742 and subsequent editions of Sydenham's *Works*[23] edited by John Swan. Sydenham's education was interrupted by the Civil War, during which he was a Captain of the horse for the Puritans. He received his Bachelor of Physick from Oxford in 1648 and practised in Westminster. He is primarily remembered for his clear, first-hand accounts of chorea minor,

hysteria, and gout, from which he and Johnson both suffered. Johnson observed in Sydenham a characteristic applicable to many great investigators:

> . . . there is no instance of any man whose history has been minutely related, that did not in every part of life discover the same proportion of intellectual vigour; but it has been the lot of the greatest part of those who have excelled in science, to be known only by their own writings, and to have left behind them no remembrance of their domestic life, or private transactions, or only such memorials of particular passages as are on certain occasions, necessarily recorded in publick registers.[14]

Sydenham suffered from a kidney stone and, as Johnson notes, "its natural consequence, bloody-urine," and died at the early age of 52. Johnson laments:

> It is a melancholy reflection, that they who have obtained the highest reputation, by preserving or restoring the health of others, have often been hurried away before the natural decline of life, or have passed many of their years under the torments of those distempers, which they profess to relieve.[14]

Although this paper is devoted to medical biographies, mention must be made of the poem Johnson wrote on the death of "an obscure practitioner in physick," his close and humble friend, Robert Levett. Levett lived with Johnson for 36 years, and was an admired companion. His medical education began as a waiter in the coffeehouses of Paris that were frequented by the surgeons who ". . . finding him of an inquisitive turn and attentive to their conversation, made a purse for him, and gave him some instructions in their art. They afterwards furnished him with the means of other knowledge, by procuring him free admission to such lectures in pharmacy and anatomy as were read by the ablest professors of that period."[2] While he lived with Johnson, he took care of the poor from "Hounsditch to Marybone," and received little or no fees; he dedicated many of his hours to John Hunter's lectures. Johnson said that all his medical knowledge, and it was not inconsiderable, was obtained by ear. Undoubtedly, Johnson was curious about all Levett knew, and learned much from his old and faithful friend. Boswell relates he had heard Johnson say that he should not be satisfied, though attended by all the College of Physicians, unless he had Mr. Levett with him. When Levett died, he wrote that "poor Levett died in his bed the other day, by a sudden stroke; . . . the apothecary opened a vein, but could draw no blood; . . . I suppose not one minute passed between health and death."[2] Grieved by Levett's death he penned:

Condemn'd to Hope's delusive mine,
As on we toil from day to day,
By sudden blast or slow decline
Our social comforts drop away.

Well try'd through many a varying year,
See Levett to the grave descend;
Officious, innocent, sincere,
Of every friendless name the friend.

Yet still he fills Affection's eye,
Obscurely wise, and coarsely kind;
Nor, letter'd arrogance, deny
Thy praise to merit unrefin'd.

When fainting Nature call'd for aid,
And hov'ring Death prepar'd the blow,
His vigorous remedy display'd
The power of art without the show.

In Misery's darkest caverns known,
His ready help was ever nigh,
Where hopeless Anguish pour'd his groan,
And lonely Want retir'd to die.

No summons mock'd by chill delay
No petty gains disdain'd by pride;
The modest wants of every day
The toil of every day supply'd.

His virtues walk'd their narrow round,
Nor made a pause, nor left a void;
And sure th' Eternal Master found
His single talent well employ'd.

The busy day, the peaceful night,
Unfelt, uncounted, glided by;
His frame was firm, his powers were bright,
Though now his eightieth year was nigh.

Then, with no throbs of fiery pain,
No cold gradations of decay,
Death broke at once the vital chain,
And freed his soul the nearest way.

CONCLUSIONS

This paper has touched on some of the high points in Dr. Johnson's lives of physicians and brought together for the first time all of his known biographies of physicians with elaboration on the work of Hazen. Another biography, that of Oribasius, is suggested as possibly having been composed by Johnson, but I have not in-

cluded it. These medical biographies have been mentioned occasionally by physicians and Johnsonian scholars for many generations, but there has been no previous attempt to gather them together. The biographies are all examples of excellence in writing and composition without parallel and, as Hazen points out, should be published at least once where they may be available for physicians and the public. Fortunately, this is being done by Yale University under the editorship of Herman W. Liebert.

Finally, we might speculate on how much medicine Dr. Johnson really knew, especially since he "was very fond of the study of physick."[2] If he merely translated or compiled the biographies in James's *Dictionary,* he must have been exposed to a great deal of medicine, and therefore absorbed a certain amount. Similarly, as Liebert notes,[18] one of his great sources of knowledge was the reading he must have done to supply the medical definitions and quotations in his own *Dictionary,* where medical terms are very fully covered. His library contained the works of Hippocrates, Galen, Fabricius, Paracelsus, Soranus, Boerhaave, and Willis, as well as Cheyne's *English Malady,* Cheselden's *Anatomy,* Mudge's work on catarrhous cough and smallpox, and works on chemistry.[19]

Johnson's extensive writings give us a few clues to his medical knowledge, such as a letter to Boswell concerning his wife: "Mrs. Boswell's illness makes a more serious distress. Does the blood rise from her lungs or from her stomach? From little vessels broken in the stomach there is no danger. Blood from the lungs is, I believe, always frothy, as mixed with wind."[2] His "Aegri Ephemeris" (Sick Man's Journal),[15] kept for his physician, Dr. Thomas Lawrence, shows that he had considerable knowledge of the effect of his various medications on his symptoms and thereby was able to regulate his dosages with fair accuracy, taking specific medicines for specific complaints. The matter of Johnson's knowledge of medicine as compared to that of contemporary eighteenth century physicians requires further study especially in view of the acquisition of new material. We may safely conclude with Hutchinson, however, that "his power of penetrating to the essence of a subject and disregarding unessentials, his sterling common sense, his hatred of fads, his prodigious memory, and his keen interest in physical sciences would have made him eminent as a physician."[9]

ACKNOWLEDGMENT

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An Anonymous Publication on Vaccination by John Conolly (1794-1866)

RICHARD A. HUNTER AND IDA MACALPINE*

"WHEN the grave has closed over a man, the greater part of whose life has been devoted to works of benevolence, which have conferred a lasting benefit upon mankind, it is due to his memory that the public should be reminded of what he did." These opening words of Sir James Clark's *A memoir of John Conolly, M.D., D.C.L., comprising a sketch of the treatment of the insane in Europe and America* (London, 1869) encouraged us to draw attention to two minor works of 1822 and 1824 by Conolly in which he set out to provide the public with facts and figures proving the safeguards afforded by vaccination and its superiority over the old variolous inoculation. Both have remained unnoticed: the first because it was published anonymously and remained so until here traced to Conolly; the second because of its rarity. An additional reason may be that they were written while Conolly was on the threshold of an outstanding medical career and were soon overshadowed by other writings and achievements. In 1828 he was appointed the first Professor of the Nature and Treatment of Diseases at the recently founded University of London (where incidentally his opposite number in the Chair of Surgery and Physiology was Charles Bell); this appointment was followed in 1830 by the first of his classic books on clinical psychiatry and asylum reform, *An inquiry concerning the indications of insanity*. Later he devoted himself especially to the management and treatment of the insane without mechanical restraint and became one of the internationally great figures of nineteenth century psychiatry if not of psychiatry of all time. But his publications on vaccination sank into oblivion even in his lifetime, and Conolly himself never referred to them although he continued to work for the general acceptance of vaccination. In 1833, by which time he had returned to the Midlands and was practising as a physician at Warwick, he was elected at the first anniversary meeting of the Provincial Medical and Surgical Association a member of "a Committee to draw up a Report on Vaccination."[1] It may be of interest that

* London, England.

Conolly was also appointed the Association's first American correspondent, empowered "to open a communication with eminent Medical Practitioners in . . . America . . . to note discoveries or questions in agitation, new works appearing, and experiments in progress."[2] Under the chairmanship of Dr. John Baron the committee reported to subsequent annual general meetings and in 1839 delivered a long report published in the *Transactions*.[3] In that year Conolly resigned from the Committee to take his appointment, and in so doing entered upon his life's work as resident physician to the Middlesex County Lunatic Asylum, Hanwell. By this time his brother William Conolly, M.D., a physician of Cheltenham, had become one of the Committee's joint secretaries.

At the time of his death in 1866 both his publications on vaccination had been forgotten. Neither was mentioned in his obituary notices, not even in those by his sons-in-law Maudsley[4] and Harrington Tuke,[5] nor in the later accounts by Brown[6] and Norman,[7] nor in Clark's full-scale biography already quoted. Today, with the exception noted at the end of this paper, they are not listed among Conolly's writings in the catalogues of the major medical libraries which we have examined, and the earlier one is not in Halkett and Laing.

The first book was written under the following circumstances. After obtaining his M.D. (Edinburgh) in 1821, Conolly went into general practice at Lewes, Sussex, but after a few months moved to Chichester about the same time as Dr. John Forbes with whom he was afterwards to collaborate in many medico-literary projects such as editing *The cyclopaedia of practical medicine*, 1833-1835 (with Dr. Alexander Tweedie) and *The British and Foreign Medical Review*, 1836 *et seq*. The city and its vicinity were in the grip of a smallpox epidemic which had gained ground because of the low rate of vaccination especially among the poorer classes. In the resulting panic the public, having as yet little or no confidence in the protective value of vaccination, returned to the old hazardous variolous inoculation which continued to be vaunted and practised mostly by non-medical inoculators: "The chief inoculators in Sussex were three in number, a knife-grinder, a fishmonger, and a whitesmith: there were also some female practitioners. On the whole, I cannot but wish that the regular surgeons would resign this branch of the profession altogether to these their less respectable coadjutors" (Conolly, 1824, p. 36). "It was not mere negli-

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AN

ADDRESS TO PARENTS,

ON THE

PRESENT STATE

OF

VACCINATION

IN THIS COUNTRY;

WITH AN IMPARTIAL ESTIMATE OF THE PROTECTION WHICH IT IS CALCULATED TO AFFORD AGAINST THE SMALL-POX.

BY A CANDID OBSERVER.

LONDON:

PRINTED FOR

LONGMAN, HURST, REES, ORME, AND BROWN,

PATERNOSTER-ROW.

1822.

FIG. 1.

gence or procrastination that kept parents back, it was distrust of the new practice and preference for the old."[8] To stem this retrograde movement Forbes[9] published in the medical press an account of the epidemic and its lessons, while "A Candid Observer"—Conolly's pseudonym—wrote for the laity a plea for vaccination entitled *An address to parents, on the present state of vaccination in this country* (London, Longman *et al.*, 1822), price 3s. Od. (see Fig. 1). Its purpose was to answer such questions as

whether . . . cases of small-pox after cow-pox are become more frequent . . . whether there is any reasonable probability of its increasing, and what is the present ratio of those who are effectually secured, to those who undergo the small-pox in after life;—whether there are any means of increasing the security which one vaccination may have given;— whether . . . vaccination . . . ever proves fatal, and if it does, in what proportion is the mortality to that of the *natural* or *inoculated* small-pox . . . whether, in short, they [the faculty] still continue to recommend it [vaccination] with the same earnestness, and the same firm conviction of its advantages, as they did ten, fifteen, or twenty years ago (pp. 8, 7).

He hoped in this way to "contribute something" to the "extension and stability . . . of vaccination; perfectly sincere in his belief, that it is the only security against small-pox upon which the public ought to rely, and . . . with undiminished confidence."

The book was received for review by *The London Medical and Physical Journal* in November 1822, and an extensive notice was published the following month: "We think the pamphlet calculated to do good, and therefore we have this early noticed it." The reviewer, although without a clue to the author's identity, guessed he was a professional man because

first, he understands the subject thoroughly; and, secondly, he speaks well of the "doctors." Whether others who read it may draw the same conclusion as to its author, may be a question; but no one, we are sure, will deny that he is impartial in his statements, and convincing in his inferences. It is true there are no new doctrines advanced, nor any pretensions to original views; but the work is thereby better calculated to fulfil the object of the author, which is literally to give a fair estimate of the protection afforded by vaccination against small-pox . . . It is a book about which medical men are likely to be questioned in families where they visit, and we therefore advise them to read it.[10]

In the book incidentally Conolly referred to a letter by Dr. Jenner "lately published in the newspapers, wherein he states, 'that this island might have been entirely freed from small-pox many years ago, if its wisdom, in this respect, had kept pace with many of the continental kingdoms, where small-pox has been entirely unknown for many years' " (pp. 55-6). There is no reference to this letter in Baron's biography of Jenner[11] or in LeFanu's bio-bibliography,[12] and we ourselves have not yet traced it.

An address to parents might well have remained anonymous and unidentifiable. But Conolly himself left a clue, by which we were able to establish his authorship, when two years later similar circumstances in another part of the country to which he had removed led him to take up this theme again. After about a year in Chichester, where there was insufficient practice for both him

OBSERVATIONS

ON

VACCINATION,

AND ON

THE PRACTICE OF INOCULATING

FOR THE

SMALL-POX.

WITH AN APPENDIX OF CASES AND FACTS.

BY

JOHN CONOLLY, M. D.

PHYSICIAN TO THE STRATFORD DISPENSARY,

&c. &c.

Stratford-upon-Avon:

Printed and Published by R. Lapworth;

SOLD ALSO BY BALDWIN, CRADOCK, AND JOY, LONDON; SHARPE, MERRIDEW, AND ROSE, WARWICK; BEILBY, KNOTT, AND BEILBY, AND WRIGHTSON, BIRMINGHAM; ELLISTON, LEAMINGTON; MERRIDEW, COVENTRY, &c.

1824.

FIG. 2.

and Forbes, he settled in Stratford-on-Avon towards the end of 1822 and quickly established himself as a distinguished citizen as well as physician. He became alderman and mayor of the town, "and being a reformer by nature and a hearty liberal in politics, ardently devoted himself to the furtherance of every measure of progress."[4] He "took a warm interest in everything related to the social condition and sanitary improvements in the borough," including soon after his arrival the establishment of "a public dis-

pensary, which proved a great benefit to the poor of Stratford and the vicinity"[13] and later became the Stratford-upon-Avon Hospital. It offered among its services free vaccination to poor children:

> In the Public Dispensary recently established at Stratford, every facility is offered to vaccination. A correspondence has been opened with the National Vaccine Institution; a day has been appointed in each week for vaccinating the children of the poor gratuitously. . . . Hitherto, however, although . . . open five months, and numerous patients, many of whom have come from distant villages, have applied for advice and medicines, *not one* application has been made for *vaccination* (Conolly, 1824, pp. 51-2).

After almost two years there he published in March 1824, under his own name, *Observations on vaccination, and on the practice of inoculating for the small-pox* (Stratford-upon-Avon, Lapworth), price 3s. Od. (see Fig. 2). The only review of this book which we could find, although our search has not been exhaustive, was one printed a year after its publication in *The London Medical Repository* (1825, *23*, 351):

> This unpretending brochure possesses great merit, and is calculated to do much good wherever it circulates. The research and reasoning which characterise it, as well as the importance of the subject which it discusses, ought to insure it an extensive circulation, if it were republished in the metropolis.

This tardy and isolated notice may perhaps be explained by the fact that Conolly had about that time started to assist Dr. James Copland in editing this journal.

Like the earlier book it was "chiefly addressed to general readers" and began:

> About two years ago, during my residence at Chichester, in the neighbourhood of which city vaccination had for some years been much disregarded, and the small-pox was in consequence prevailing very extensively and fatally; the usual evils of that disease being there aggravated by the barbarous methods of introducing the variolous matter practised by some itinerant inoculators; I published some observations intended to shew the folly, danger, and unjustifiableness of such conduct, and the many and great advantages of vaccination. In re-publishing part of those observations, in circumstances not very dissimilar, I am perhaps not wholly uninfluenced by the favourable manner in which my former remarks were received.
>
> Since that period, I have been put in possession of many additional particulars of considerable interest; and having learned, with much regret, partly from personal observation and partly from the report of my professional friends, that considerable prejudices exist in this part of the country against the cow-pox; finding, with much surprise, that there are even a few members of the medical profession who continue to inoculate for the small-pox; and that, in a great measure from this circumstance, the distrust of vaccination is by no means confined to the poorer classes of society; — above all, having heard of great fatality from a recent small-pox epidemic in several

parts of this country, and knowing that the disease is at this hour prevailing and spreading more and more in this very neighbourhood; I conceive that I shall be doing my duty to the public by laying before them the result of all the attention I have been able to pay to the effects of vaccination, with a sincere desire to make a correct estimate of its value.

With this intention, I have neglected no opportunity of observing the effects of cow-pox, and have diligently examined all the cases of its failure to protect which have been reported to me, or have occurred within my own observation. Without making many private applications to other medical practitioners, or endeavouring to accumulate, as I might have done, a load of evidence which few readers would have had patience to examine; I have neglected no public document to which I have had access, and have disregarded no information from private sources of respectability; and with these helps alone, I think I shall be able, in the course of a few pages, to shew, that the discovery of vaccination is one of the most valuable acquisitions which the medical profession was ever instrumental in making for mankind, and that after more than twenty years' trial of what vaccination can effect, it ought now and for ever to be cherished, as it was at first hailed, as a blessing to the whole human race.

Our first indication that Conolly had previously written on vaccination came from his own statement quoted in the above extract: "About two years ago, during my residence at Chichester . . . I published some observations intended to shew . . . the many and great advantages of vaccination." This led us to search contemporary journals, publishers' lists and library catalogues. We found nothing under his name and only the anonymous publication already described during the relevant period 1821-2. We then compared the work of the "Candid Observer" of 1822 with Conolly's of 1824, when it became obvious from the similarity of style and content, and identity of message, that they were by the same author. Although *An address to parents* contained no hint of the locality in which the outbreak of smallpox which gave rise to it had occurred, we now knew that it was Chichester. We therefore turned to Creighton's *A history of epidemics in Britain*[8] and there found quoted Forbes's paper[9] mentioned above; this we consulted hoping to discover a reference to and so confirmation of Conolly's authorship in a contemporary source. And there it was in a footnote: "For an eloquent and excellent appeal on behalf of vaccination, I beg to refer to a small pamphlet, lately published by my colleague, Dr. Conolly." Perhaps Conolly chose the pseudonym "Candid Observer" because the first letter of each word together make up the first two of his name.

Why did Conolly publish *An address to parents* anonymously whereas he sent the later *Observations on vaccination* into the world under his name? He may have felt that as a little known

physician of Chichester his name would have left his colleagues unimpressed, while to reveal that its author was a medical man might have prejudiced the public against his message since he would be suspected of bias for vaccination just as unqualified inoculators were accused of bias for inoculation. Once settled in Stratford where he was widely known and respected socially and professionally he doubtless assumed that his name would lend the weight of authority to his appeal, at least in the locality.

Why have these books remained unnoticed in the history of vaccination[14] since they must have done much to popularize it during a somewhat precarious phase? The answer is probably that surviving copies were rare even in the nineteenth century and of course are even rarer today—perhaps an indication that they were widely read. Of the major medical collections in London (British Museum, British Medical Association, Medical Society of London, Royal College of Physicians, Royal College of Surgeons, Royal Society of Medicine, Wellcome Historical Medical Library, London School of Hygiene which specializes in all matters relating to public health) only the Royal College of Physicians (Dr. Matthew Baillie's copy inscribed "From the author") and the Royal Society of Medicine have *An address to parents,* catalogued in both cases as anonymous; none has a copy of *Observations on vaccination.* Of the published catalogues of American libraries which we have examined for these two books, we have found only *Observations on vaccination,* in the *Index-Catalogue of the Library of the Surgeon-General's Office,* First series. That *Observations on vaccination,* which contains the clue to Conolly's authorship, is apparently the rarer of the two may help to explain why *An address to parents* has remained anonymous for almost a hundred and forty years.

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Florence Rena Sabin — Teacher, Scientist, Citizen*

VINCENT T. ANDRIOLE**

The Formative Years

IN the early '60's of the nineteenth century, a young man, born and raised on a typical New England farm, gave up the study of medicine and left the conservatism and safety of Vermont to go west. The first great gold strike was on in Central City, Colorado, a village now, but then, and for years after, a rival of Denver in prominence and population. The young man, George Kimball Sabin, a descendant of William Sabin (a Huguenot who settled in Rehobeth, Massachusetts, in 1643), became a mining engineer. Soon afterward, Rena Miner, a Vermont girl who had been teaching in the South when the Civil War broke out and who had left under a permit from General Sherman, came to teach school in this new western country, reputed to be Golconda.[1] Two young people of education, with a cultural background far above that of the rude settlement about them, could not fail to meet. In a short time they married.

Florence Rena Sabin was born on 9 November 1871 at Central City in the Colorado mining camp country. However, she received all her education in the East, first attending Vermont Academy at Saxton's River, Vermont. Deciding to become a scientist, she entered Smith College and was graduated with a Bachelor of Science degree in 1893. In both the academy and college she distinguished herself in mathematics, zoölogy, and laboratory studies, and by the time of her graduation she had determined to become a doctor. But like many other eager young students, she was plagued by financial insecurity and the fact that it was extremely difficult for a woman to study medicine. The first of these hurdles was overcome by teaching mathematics at Wolf Hall in Denver and at Smith College for the next three years. The second hurdle was not quite so difficult.

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The Johns Hopkins Medical School was opened in 1893, the same year that Miss Sabin had been graduated from Smith College. The necessary funds had been contributed by a group of Baltimore women, led by Miss M. Carey Thomas and Miss Mary E. Garrett. The fund was, in the main, given by Miss Garrett, but far more important than the actual money, which determined the time of opening of the new medical school, were the conditions under which the fund was given and accepted. The conditions laid down by Miss Thomas for the acceptance of students were a college degree or its equivalent, a knowledge of physics, chemistry, and biology, proficiency in foreign languages, and the admission of women on the same terms as men. This was a great event in the history of medicine, for the adoption of these requirements for admission to the new medical school in Baltimore lifted the standards of the whole medical profession in this country and made medicine a graduate subject. Within a short time all the good schools raised their standards of admission, and the poorest schools were closed.[104]

Since Florence Sabin fulfilled these requirements, she was given the opportunity to enroll at Johns Hopkins School of Medicine, and "Flossie," as she was often called by those who knew her well, entered the fourth class, one of 15 women in a class of 42. As a medical student she won distinction. Original investigation on the part of the students was encouraged, a tradition which in several schools is an essential part of the medical student's education today. From the beginning, she attracted the attention of her professors by her accuracy and skill, and by the originality of her theories. Because of this it was suggested to her by Dr. Lewellys F. Barker and Dr. Franklin Paine Mall (the latter being Professor of Anatomy at that time and ultimately one of her closest friends) that she make a model of the brain stem of a newborn child. This had never been done before, and she attacked the problem with ingenuity and ability. Constructing models for medical study then was done by the "wax plate method of Born." This consisted of making sections and then reproducing the outlines of the sections on wax plates with a machine designed for that purpose. The method had already been used by many observers in the fields of embryology and comparative anatomy, but no one except His had employed it in the study of the central nervous system and he had represented only the development of the external form of the neural tube and the positions of the cerebral nerves. Sabin decided to adapt this method to show the form of the internal structures, namely, the nuclei, the nerves, and the central tracts. In so doing

she used the medulla, pons, and midbrain of a newborn child. The resulting model threw new light on the tracts and the general structure and arrangement of the lower part of the brain. Manufactured in finished form by a professional model maker in Germany, it was used for many years in the teaching of neurology both at Hopkins and elsewhere. The results of her first endeavor were published in the *Papers from the Anatomical Laboratory* of the Johns Hopkins University in 1900.[55,58]

It was then suggested by Dr. H. M. Knower of the Anatomical Laboratory of the Johns Hopkins Medical School that the description of the model be put into a more convenient form for the student. Consequently, Sabin prepared an *Atlas of the Medulla and Midbrain,* which contained 48 figures of sections cut in two planes and drawn to resemble actual preparations.[58] Before publication, the little atlas was reviewed by a number of well-known teachers in several large universities, and all agreed that it would adequately meet the student's need for a clear understanding of the important central relay-station of the brain.[58] With the success of this endeavor, Florence Rena Sabin's career began. Even before she finished medical school, she was exerting an influence on the medical education of her fellow students.

She was graduated in 1900, her training having particularly fitted her for research. She had chosen this line of adventure, but in a sense was "all dressed up with no place to go." Even at the Johns Hopkins Medical School, with its liberal attitude toward the admission of women, a woman faculty member was at that time unthought of. For a year Sabin served as an interne at Johns Hopkins Hospital. It is interesting to note that, even though her life was ultimately devoted to research, she proved an excellent diagnostician. While interning under Sir William Osler on the medical service, for example, she presented a case of fatal arterial disease, quite possibly periarteritis nodosa, in a 32-year-old woman. Up to this time there had been only four other cases described in the literature.[59]

The internship ended, and there was still no opportunity to pursue research, for there was no place yet in the professional world for women. But in this first decade of the twentieth century, women were beginning to band together in clubs and organizations in order to obtain recognition. Such early movements were the stepping stones by which, in fifty short years, women would enter, and be eligible for, almost every profession imaginable. In just one short year a position on the research staff of the Department of

Anatomy at Hopkins was opened for Dr. Sabin by a group known as the "Baltimore Association for the Promotion of University Education of Women" which provided her with an endowed fellowship in 1902. From then on, she never swerved from her goal. After her fellowship ended, she was appointed Assistant in Anatomy at Hopkins. This was the beginning of Florence Rena Sabin's "first great career," an era which I choose to call "The Hopkins Period."

The Johns Hopkins Period

1901-1924

As Assistant in Anatomy under Dr. Mall, Sabin began her official teaching career. From the first she had a profound influence upon the medical students who came under her instruction, somewhat over a thousand in number and most of them young men. It might be supposed that some would have objected to being taught by a woman, since the majority came from men's colleges in which such a thing was unheard of, but Dr. Sabin succeeded in winning the confidence and regard of her students, both men and women. This was apparently accomplished in various ways. Some of her early students attributed her success to the enthusiasm with which she undertook her duties and to her kindness and maternal protection when guiding and advising her students in the solution of their problems. Sabin also had definite ideas concerning teaching. These were in reality a reflection of the ideas and principles of the man who was not only her teacher and colleague, but her chief, her adviser, and most of all, her warm friend, Franklin Paine Mall. The story of his life exemplifies how medical research was started in this country. In 1883, after he had received his medical education at the University of Michigan, Mall went to Germany and began his scientific education at the University of Heidelberg. The next year he spent at Leipzig under Wilhelm His, Professor of Anatomy and an outstanding embryologist. The ideas and principles which were later to have so much influence in Sabin's life originated from Mall's association with His. As Mall wrote:[98]

> When he [His] set a problem it was concisely stated; he outlined the general plan by which it was to be solved. All of the details were left to the pupil and it annoyed him to be consulted regarding them. He desired that the pupil should have full freedom to work out his own solution and aided him mainly through severe criticism.

During the following year, Mall, through fortunate circumstances, went to study in the laboratory of Carl Ludwig, one of the

greatest teachers of physiology of all time. Ludwig, born in 1816, took his medical degree at Marburg in 1839 and then taught both anatomy and physiology at Marburg, Zurich, and Vienna. In 1865 he was appointed to the newly created Chair of Physiology at Leipzig where he remained until his death in 1895.

From Ludwig, Mall gained a full comprehension of the German university, the principles of which are unique in educational history. First, the teacher had complete freedom to express his own views, indeed the obligation to teach his own work. Second, the student was free to outline his own course and, more important still, to choose his teachers. (There were usually several teachers, both old and young, in each university giving courses covering the same ground.) Third, science was pursued for its own sake. The teachers were themselves professional investigators in their own fields, and the training of investigators became one of their most important responsibilities. Herein lay the exceptional ability of Ludwig; he trained many men for research and will stand in history as the personification of the ideal professor.[99]

When Mall went to Hopkins in 1893 as Professor of Anatomy, he therefore organized his department for the inductive method of teaching. In 1896, he expressed his ideas on teaching in a paper on his course in anatomy.[100]

> I believe that there is but one way to learn any subject, and that is through study. The very name student tells what the person so named should be doing; and with a natural science, dealing with a most complex object, extending through three dimensions of space, any other method besides studying the object is practically useless.
>
> Lectures with demonstrations are certainly valuable—more valuable than the lectures with text-books alone. Yet analyzing the object itself is infinitely more valuable than to watch the results exposed by another. Wrestling with the part which is being studied, handling it and viewing it from all sides, and tabulating and classifying the parts worked out, give us the greatest reward. All this can be accomplished by practical laboratory work. If we can make the student work thoroughly and carefully, a great result is achieved. It makes of him an artist, an actor, an expert, not a dilettante. He is upon the stage, not in the audience.

This was Mall's fundamental contribution to education—the concept that self-education is the only method which has lasting value.[100]

Sabin was a product of the His-Ludwig-Mall school. Throughout her career as a teacher she emphasized the concept of self-education and student research. "Books are merely records of what other people have thought and observed," she would tell her students, "the material is a far safer guide." A pupil in Sabin's his-

tology class at Hopkins in 1909 (Sabin had advanced in 1905 from assistant in anatomy to associate professor of anatomy) describes her in those days as:

> Dressed very plainly, usually with a plain brown skirt of tweed. No cosmetics. Neat but not ostentatious. After all, business was business. She would lecture twice a week. Very rapidly spoken, a little muddy—she was so enthusiastic in trying to correlate the scientific and medical aspect of anatomy (histology). She would tear up her notes after each lecture so that she would have to work it over the next year.

Dr. Sabin proved a conspicuously able and successful teacher not only in the matter of imparting knowledge, but also in the more difficult art of discovering the gifted student and stimulating him to independent work beyond the classroom. Evidence of this lies in the fact that one of her distinguished pupils, George W. Corner, organized a Journal Club composed of five or six students who met with her every week. One student would review a recent paper which would be discussed by Dr. Sabin who was an excellent critic.

Dr. William H. Howell, in presenting a portrait of Sabin to the Johns Hopkins University at the Commemoration Day Exercises on 23 February 1920 paid tribute to her as teacher and investigator:

> When I think of Miss Sabin's work in the Medical School it seems to me that she has been an ideal university professor. Successful in teaching, productive in research, conscientious and cooperative in all routine duties of an administrative character. Following the admonition of Pasteur she has chosen to dwell in the serene peace of the laboratory and library, and in this environment has given her time and best energies to the work belonging to her position.
>
> . . . Some such human factor is essential to give color and timbre to the more sober professorial attributes if a sympathetic understanding is to be reached between teacher and student. I fancy that Dr. Sabin's impulsive sincerity has helped greatly to open the way to the hearts of her pupils and friends.
>
> In offering this painting to the University, Mr. President, we, her colleagues, students, and friends, feel that it will be a matter of especial interest in the history of the Medical School to have preserved a portrait of its first woman professor, one of its most distinguished graduates and one who has contributed so much of real worth to the building up of the School and to establishment of its reputation as a center of medical research.[3]

Sabin felt that research and teaching were inseparable. She often said: "Research lifts teaching to a high plane. No one can be a really great educator unless he himself is an investigator."[117]

At the suggestion of Mall, she had begun a study of the development of the lymphatic system. At that time it was thought that the

lymphatics grew from small openings in the tissues. By means of an ingenious method she was able to discover the mode of origin and development of the lymphatic vessels of the body. Most of the experiments up to that time had dealt only with small portions of live tissue from various parts of the body. Sabin decided to attempt the study of a living organism as a whole. Her technique was to remove tiny chick embryoes from eggs and keep them alive in a warm box under the microscope. They were so rudimentary that the heart had not developed and so transparent that they could be seen through. She was able to observe in these hanging-drop preparations the differentiation of angioblasts from the mesoderm. The theory proposed from her observations and conclusions was revolutionary in its reversal of earlier beliefs. Her conclusions follow:

> The most important result of this study on the morphology of the lymphatic system is the emphasis it throws on the importance of endothelium as a tissue. The angioblast is one of the early tissues to be differentiated; it is not an inert lining for vessels, but an actively functioning tissue.
>
> The lymphatic endothelium buds off from the veins. It is always a little different in appearance from the endothelium of the veins and capillaries. The growing lymphatic tip has the remarkable characteristic that it avoids the blood capillaries, while it is attracted by other lymphatic capillaries.
>
> Endothelium is the essential tissue of the lymphatic system. In the lower vertebrates lymph hearts are formed by the addition of striated muscle to primary lymph sacs. In the higher forms lymph glands are formed by the development of lymphocytes around the ducts. This takes place not only in the wall of the primary lymph sacs, but along plexuses of ducts, so that there are primary and secondary lymph glands.
>
> The fundamental morphology of the lymphatic system has been established, but there remain many gaps in our knowledge of the system as a whole.
>
> It is now possible to define the lymphatics. Lymphatic capillaries are tubes of endothelium; they are derived from the endothelium of the veins, and they have the same relation to tissue spaces as have blood capillaries.[60]

This was the first work to demonstrate that the lymphatics sprouted from the walls of veins. It has since received recognition by many anatomical writers interested in this field. The paper, entitled "The Origin of the Lymphatic System," was awarded the $1000 prize offered by the Association for Maintaining the American Woman's Table at the Zoological Station at Naples and the Association for Promoting Scientific Research by Women "for the best scientific thesis written by a woman embodying new observations and conclusions based on independent laboratory research." Through this association impetus was given to all research work among women.[46]

Sabin followed this first paper with a series of important contributions bearing upon the same general subject which appeared in various scientific journals here and abroad and connected her name permanently with this topic in medical literature. Her own contributions and those of other workers were discussed in a notable lecture she delivered in 1915 before the Harvey Society of New York.

Because of the close relationship between the lymphatics and the blood vessels, Sabin's future investigations were inevitably directed toward the embryology of the vessels themselves, the significance of the various types, and changes in red and white cells in health and disease. This research led her to re-study the old problem of how the blood vessels arise and develop and, again working with the blastoderms of chicks, she followed the development of the veins and capillaries in the living specimen. She was actually able to witness the birth of the blood stream—the origin of the red corpuscles developing from minute buds on the walls of the veins and various types of white cells forming from certain cells in the connective tissue. She was also able to show that the first blood plasma developed by liquefaction of the cells forming the walls of the first blood vessels. By 1919 she published her findings in the Mall Memorial Volume of the *Bulletin of the Johns Hopkins Hospital,* a contribution to the knowledge of the origin and development of the blood and blood vessels which was as significant as her work on the lymphatic system.

One of the methods of observing the growth of blood vessels was by following their regeneration in the healing of end-to-end intestinal anastomoses. In this study Sabin and Halsted, the great Johns Hopkins surgeon, worked together, Halsted performing the operations on dogs. By observing the healing of the anastomoses, it became evident that the regeneration of the vessels was limited to specific areas. The endothelium of the old vessels reverted to its original angioblastic type. A great multiplication of the endothelial nuclei then occurred. The latter formed cords, acquired lumina through cytoplasmic liquefaction, and became capillaries and then arteries or veins. The results of this paper were confirmed by similar observations of the embryo and were published in a second article in 1922 entitled, "The Direct Growth of Veins by Sprouting."[64]

Carrying this work to the investigation of the individual cells formed in the red and white cell series, Sabin devised a technique for keeping the cells alive for several hours, and by the use of vital

staining established criteria for erythroblasts and the differentiation of the three strains of white blood cells on the basis of their specific, vitally stainable granules. With this method she showed that the erythroblast, forming directly from an angioblast, took on a characteristic granulation by the second and third day and underwent specific steps to maturation. This gave a specific criterion for distinguishing the primitive red cell from the other types of blood cells. She also found that the monocyte made its appearance on the third day of incubation, developing within the vessel from the endothelium. At the same time the clasmatocytes, identical with the monocyte in form, were arising from the endothelium on the outside of the vessels. Therefore, Sabin proposed, the monocytes of the blood and the clasmatocytes of the connective tissue are derived from the same epithelium and are identical except that one is intravascular and the other extravascular; further, that afterward they are interchangeable, for clasmatocytes were seen to enter the vessel and monocytes to pass out. It was also seen that granulocytes were formed on the third day of incubation from the mesoderm outside the vessels and that there was no evidence of the formation of the lymphocytes in the yolk sac membranes, even though they were found in the circulating blood on the fourth and fifth days.[66]

Sabin then began studying the differential count by examining drops taken from her own arm, and found a rhythmic rise and fall of the various cells of the blood taken from one person.[78] And in 1923 she reported the first differential count by the supravital technique, made on abnormal blood (from a patient admitted to the Johns Hopkins Hospital on 18 October 1922), and showed a fever of a moderate grade correlated with a blood count in which the total number of white cells was normal but in which there were 10 per cent monocytes. The diagnosis of Malta fever was made by finding the organism in the circulating blood. The differential count, done on 25 November was as follows:[71]

Polymorphonuclear leucocytes 32%; nonmotile polymorphonuclear leucocytes 6.2%; eosinophils 1%; basophils 1%; lymphocytes 39.5%; large monocytes 0.7%; transitionals (mononuclears) 18.5%.

The value of this work was summed up by Dr. Sabin herself:[78]

The fact that there is a fairly constant number of white blood cells per cubic centimeter of blood, and that there are variations of this number characteristic of different types of disease, has become common medical knowledge since the methods for counting blood cells were introduced. There is indeed nothing in the entire animal economy more amazing than the fact that from hour to hour and from day to day, the number of white blood cells

Florence Rena Sabin, 1871-1953

remains so remarkably constant. It is wholly obvious that the mechanism involved in the maintainence of this remarkable condition must be one of great importance and it is hoped that the present communication may assist somewhat in inaugurating a better understanding of the physiology of the white blood cells.

Before leaving Hopkins in 1925, Sabin, collaborating with two of her former pupils, Dr. R. S. Cunningham and Dr. Charles A. Doan, studied the reactions of the blood cells in disease. The first of these studies was on the maturation of myeloblasts into myelocytes and on amitotic cell division in the peripheral blood in subacute myeloblastic leukemia. Again using the vital technique for staining the cells, the investigators followed the maturation of the myelocytes from the myeloblasts, and found that this was correlated with a decrease in the number of mitochondria and a change in the cytoplasm in its reaction to basophilic dyes in fixed smears. Observing amitosis in a case of subacute myeloblastic leukemia, they felt that the absence of cell division was the most striking feature and was evidence of a disordered cellular process, since amitosis was so abnormal as to suggest the disordered cell division of neoplasms. The process had none of the characteristic sequence of events seen in the amitotic division of normal cells.[72]

The next challenge that Sabin accepted was in the field of tuberculosis. Her plan was to assess the role of the monocyte in its response to tuberculosis. Assisted by a grant from the Research Committee of the National Tuberculosis Association, Sabin along with R. S. Cunningham, S. Sugiyama, and J. A. Kindwall investigated the effects of the various chemical fractions of the tubercle bacillus on the maturation of the monocyte. In 1925 Simon Flexner asked her to join him at the Rockefeller Institute for Medical Research in New York and to carry on her investigations in this field.

Florence Rena Sabin's achievements at Johns Hopkins were many. She had been the first woman intern in 1900-1901; the first woman to become associate professor of anatomy (1905-1917), and a full professor of histology (1917-1925). During this time, she was a member of the editorial board of the *Anatomical Record* and had written extensively on anatomy. She was also a member of the Association of Collegiate Alumnae.[49]

In 1923 she was named by the League of Women Voters as one of the 12 greatest living women in America. In making public their choices, the committee declared it was "humanly impossible" to know who the greatest women were and that the selections

had been made on the basis of those who had contributed most in their field to the betterment of the world.[8]

From 1924 to 1926 Florence Sabin was the first woman President of the American Association of Anatomists (she had been Vice-President 1909-1910) and in Washington on 29 April 1925 she was elected to life membership in the National Academy of Science, the first woman to be chosen a member in the 62 years of the Academy's existence.[9,10] In the same year Smith College, her alma mater, conferred upon her the honorary degree of Doctor of Science. Several institutions had attempted to attract her to posts in their faculties. One interesting call of this kind was to the Chair of Anatomy in the Woman's Medical College, London.[3]

The year 1925 brought to a close the Hopkins period and the first career of Florence Rena Sabin—that of a great teacher. Her own words can best describe the attitude with which she went on to establish her second career—that of a scientist. In a presidential address before the American Association of Anatomists in 1925 she declared:[77] "I have ceased to be a professional teacher but remain a professional student."

THE ROCKEFELLER INSTITUTE PERIOD

1925-1938

After 23 years of active, productive, and influential work, one might say that this dynamo from a Colorado mining camp had contributed to the progress of science and the advancement of medical education more than one would expect during the whole lifetime of a moderately successful person. But Sabin at the age of 54 began at the Rockefeller Institute of Medical Research a new career which was to last for 13 years and which was as productive and influential in medical education, investigative research, and individual recognition as the previous 23 years at Hopkins. But although now in New York her ties with the Hopkins remained close.

Biography of Mall

If we familiarize ourselves with the minds and personalities of those men and women who formed the hub of medical science during this era—Mall, Flexner, Welch, Cushing, Osler, Halsted, Howland, Janeway, Avery, Bloom, MacCallum, and many others—we can understand why medicine progressed by leaps and bounds. The Baltimore group was continually trying new methods and improving their system of medical education, and their foresight and

experience is reflected in our medical schools today. Their productiveness never seemed to reach a peak but continued to grow with each passing year.

Sabin's opinion on the progress of medical education can be learned from her biography of Franklin Paine Mall, *The Story of a Mind*. It was Mall, as mentioned before, who gave her a start in medicine. The research that she undertook was on problems he presented. He was the person who trained, encouraged, and guided her through her early endeavors, and her conception of medical education and of teaching were reflections of his ideas. It has been said that Sabin had a "deep filial regard" for Mall, and so it might be expected that after his death in 1917 she should carry on in his place.

Franklin Paine Mall was the person most influential in the fight to establish full-time professors in clinical medicine. The idea of putting the teaching of clinical medicine on a university basis he had received from Ludwig, and although Mall was never in the limelight, it was he who continually stressed the point that each leader of a department in a true university was both a teacher and an investigator. Mall never made any speeches, but the people who did got their ideas from him. Therefore, it can be said that when in 1913 the General Education Board put the chairs of medicine, surgery, and pediatrics at Hopkins on a full-time basis, Mall was indirectly responsible. This was only the beginning, for the Johns Hopkins University was the first to try this plan and the real problem was not getting it started but making it work. History proves that the plan *did* work, but certain disadvantages had to be corrected.

Sabin's contribution to this reform can be estimated from an address, delivered at the commencement exercises of the Woman's Medical College in Philadelphia in 1922, entitled "The Extension of the Full Time Plan of Teaching to Clinical Medicine." In this, she discussed the drawbacks and the advantages of the full-time plan in the clinical branches, summarizing as follows:

> . . . all the problems associated with the practical extension of a full-time scheme to the clinical side have not been solved, but that opposition to extending the modern standards of professional education to clinical medicine will yield readily to sound constructive leadership on the part of those who desire this reform.[70]

Because of this close association between Sabin and Mall, it seemed only proper that she should be the one asked, twelve years after his death, to write his biography. In October, 1929, Sabin

wrote the following letter to Dr. Harvey Cushing, who was at the Peter Bent Brigham Hospital in Boston, Massachusetts, and with whom she had been corresponding regularly:

I have been asked to write a life of Doctor Mall and I can assure you that I am daily sending up a prayer for about one-tenth of your ability in putting through such a task!

I could not make clear what a perfect delight your address the other day in Baltimore was to me.

Would you be willing to look over your correspondence to see if you have any especially interesting letters from Doctor Mall and also to glance back in your memory for any stories that might be of value to me? You have had such experience in this type of work that I know anything you would send to me would be of the greatest possible value.*

I am going to try to describe Doctor Mall in terms for which, as far as I can make out, only the chemists have adequate names—and they have a whole series: Catalyzer, enzyme, activator, etc. I am playing with the idea of a comparison of the Luther and the Erasmus type. It seems to me quite appropriate, with Mall, of course, as the Luther type, and, of course I shall never mention it, but Doctor Welch as the Erasmus type.

Now then, don't tell on me and please help me out.

Cushing's reply was written two days later:

I am delighted to know that you are going to undertake a biography of Dr. Mall. He played such an important part in the modern development of scientific medicine that the facts of his life should be recorded. And then he was much more than that, a most unique figure and the developer of a great school of Anatomy. He was one of the great figures of the time no less so than Welch, Osler, and Halsted.

You know of course that Willie Mac Callum is doing a Life of Halsted, and he may very likely have run across some letters. But I found to my chagrin that these men, though they communicated with one another, never kept their letters. Just imagine what a mine of treasures Popsy himself has thrown into the waste paper basket. All he could say to me was that he had had a myriad of most amusing and entertaining and delightful letters from Osler but had never kept any of them. Mall of course corresponded with His and that I should think would be the chief source to be tapped if the letters have been preserved.

I am not so sure about the Luther and Erasmus. I look upon Mall as a combination of the two. Luther nailed his proclamation on the church door—devil take the hindmost—whereas Mall went about it more quietly. Still, I think the comparison could be effectively worked up. I shall look over my papers and see if I can find anything, but I don't believe there is anything more than a few scraps for after all I was not a person to whom he would have felt called upon to write.

I will enclose a copy of the only letter I have at hand. It was written when the move was on foot to get him here to start an institute of Embryology. I do not think he felt that the University as a whole (Minot aside)

* Cushing had received the Pulitzer Prize in 1926 for his Life of Sir William Osler.

showed any great enthusiasm. But then, people in this Puritanical part of the world don't show enthusiasm about anything, enthusiasm being rather bad form.

It is kind of you to have mentioned my address so pleasantly, but it was the only idea I had to throw out.

Much power to your elbow.

This work was five years in the making. *The Story of a Mind, the Biography of Franklin Paine Mall,* was finally published in 1934 by the Johns Hopkins Press.

Simon Flexner wrote a review of Sabin's book published in *The New York Times* on 21 October 1934 in which he remarked:

Dr. Sabin has written a vivid life of Dr. Mall. She was well equipped for the task; herself a distinguished teacher and investigator, an associate and pupil of Mall for twenty years, no one understood so well the gifted and somewhat whimsical personality, or followed more closely his scientific work, or could better render its meaning in nontechnical language. The book follows in detail, but not too much detail, the growth of an extraordinary intellect.

Cushing, after reading the book, wrote to Sabin: "I want to call your attention to a nice review of your book about Dr. Mall in the current *British Medical Journal* for November 24th, page 944. I hope you are getting many pleasant notes about the book which I have read with the greatest delight." In her reply of a few days later she said: "I am so delighted that you have read my book and approve of it. Some time I should be very happy to have a frank discussion of your feeling about the chapter on Full-Time Medicine."

As can be seen, Mall's ideas about the full-time plan of teaching in clinical medicine were still on trial. More important than this was the fact that with the publication of Sabin's book, 20 years after the so-called trial began at Hopkins, the profession was finding out how much of a part Mall had played in this reform. This is substantiated by Cushing's reply to Sabin:

Thanks for your note. I thought the chapter on full-time medicine was excellent. Dr. Mall always kept so much in the background it was difficult to know what in his quiet way he was bringing about, but I am quite sure that he really had more to do with the movement than anyone else.

It has unquestionably done a lot of good, but just how it is going to work out in the future I am not quite sure. I am on full time here at Yale, as I chose not to be at Harvard. Like any system, it enervates some people and activates others, and like everything else depends much on character and personality. Some day let's get together and thrash it out with one another.

Department of Cellular Studies, Rockefeller Institute

Sabin's dynamic cellular studies on living connective tissue and blood cells had attracted the interest of Simon Flexner, Director of the Institute, and since he wished to establish a well-planned study of both the cellular and humoral aspects of resistance to disease in the hope of acquiring further knowledge of these processes, he had urged her to accept full-time membership on the staff. This was the first such position to be offered to any woman scientist in this country, and she was to organize and direct a group of investigators who would work on correlating emerging cellular concepts with available serological information. Sabin accepted this challenge and established a Department of Cellular Studies in New York. During the years she spent at the Rockefeller Institute she added materially to medical knowledge, her most important contribution being the establishment of the principle that the cellular and humoral forces in the defense mechanism of the body are inseparable.

During this period paper after paper was published, recording the progress the group was making. The obligation to publish when progress is achieved was another concept carried over from the Mall-Ludwig-His school. Sabin often said:[117]

> The investigator who holds back his conclusions until he is absolutely sure, never progresses far. When I reach certain conclusions, I do not hesitate to publish them, even though, after further study, I may find I was wrong; then I do not hesitate to say that I have changed my mind.

Although Sabin may have honestly felt this way, not every one shared this opinion, for while all agreed that she was an excellent observer, many felt that she would on occasion let her interpretations be guided by her preconceptions. It was also well known that she was prone to criticize the work of other investigators whose conclusions did not agree with hers. An amusing example of this is recorded in a letter to Dr. Cushing, who had previously asked her opinion regarding the publication of some experimental work done by a member of his laboratory. Sabin replied:

> . . . It interested me especially and I wanted to assure you again that when I was asked about publication for Doctor Fried's work, I had recommended that it be published. It seems to me most essential always to speed to publication articles when one does not agree with them. That I learned from Doctor Mall and I most assuredly did so.

A second method she employed to indicate her displeasure is illustrated by an experience of Dr. Huntington of the College of

Physicians and Surgeons, Columbia University. Apparently Huntington doubted the validity of Sabin's methods of investigation in reference to the injecting of some of the young lymphatic vessels with dyes; in the midst of a somewhat tepid debate, Sabin is quoted as calmly saying: "Dr. Huntington's discussion is not quite that of a gentleman."

Regardless of the differences of opinion among various groups of investigators, a rather common occurrence in all fields of research, the Rockefeller Institute period produced some noteworthy results. Sabin will be remembered for her detailed experiments and histological studies of the development of the cells of the blood and of the reaction of the tissues of the body to the tubercle bacillus. Techniques which she devised, particularly that of studying living cells under suitable conditions of temperature and humidity, are in use all over the world today for a variety of purposes. In the field of hematology, the beautifully illustrated series of monographs produced by Sabin and her collaborators at the Rockefeller Institute are impressive. Though her conclusions on the origin of the red blood cell may not now be generally accepted, the stimulus her work gave to contemporary hematologists was immense.

Sabin's investigations in the field of immunology were major contributions to the better understanding of tuberculosis. Even more significant was the development from these studies of the broad general concepts of globulin-antibody formation directly from the reticulo-endothelial system. She developed the globulin-antibody concept by injecting marked antigens and observing the phagocytosis of the antigens into the vacuoles of the cells of the reticulo-endothelial system. The antigens were made soluble by the vacuoles and then passed into the cytoplasm, which was thought to be the zone of synthesis. There, in some way, the antigen was thought to increase the synthesis of globulin, which was then modified into antibody-globulin. Following this, the antibody-globulin was carried into the blood plasma. Concomitantly with the latter reaction, the serum antibody-globulin was shown to rise. Sabin also thought that it was possible for the cell which had formed a new kind of globulin to retain the globulin and therefore be sensitized, meaning that it would react differently from the normal cell in the presence of the original antigen.[114]

In conjunction with this theory, she and her group attempted to isolate a chemical fraction of the tubercle bacillus which would produce a resistance to tuberculosis in the host. That such ma-

terial exists had been proved by the enhancement of resistance by means of heat-killed tubercle bacilli as well as by living virulent or attenuated tubercle bacilli, "Bacille Calmette Guerin."

This investigation was carried out as part of the program of the Committee on Medical Research of the National Tuberculosis Association under the Chairmanship of Dr. William Charles White. The basic plan of the committee had been that standard strains of tubercle bacilli should be selected, grown on synthetic media without protein, and then analyzed chemically. The different chemical fractions were to be tested biologically in an effort to trace, first, their role in the pathology of the infection and, second, their effect on the course of the disease. These studies represent the combined work of Sabin's group during thirteen years.

In general, every cellular reaction recognized in the lesions of tuberculosis could be reproduced by fractions isolated from tubercle bacilli, but none of the fractions studied up to that time, and even at the present time, had brought about any change in resistance to the disease. The materials studied were lipids, polysaccharides, and proteins. The tuberculo-lipids and proteins all induced a new formation of monocytes; the phosphatide changed monocytes into epithelioid cells and their derivative giant cells; the waxes induced the fusion of monocytes into foreign body giant cells; the proteins induced a more varied stimulation of monocytes, that is, into epithelioid cells, macrophages, and both types of giant cells. The polysaccharides were chemotactic to neutrophilic leucocytes; monocytes were involved only indirectly in that they eventually phagocytized extravasated neutrophilic leucocytes.

For these outstanding achievements, Sabin gained due recognition throughout the country. In 1928 she received the sixth Annual Achievement Award of the *Pictorial Review* given "to the American woman who, in the opinion of a distinguished committee, has made the most distinctive contribution to American life in the fields of arts, letters, or the sciences." It was presented in the form of a check for $5,000 at a luncheon in her honor. Following this she became in 1935 the third recipient of the M. Carey Thomas Prize, which was given at intervals to an American woman in recognition of eminent achievement. The presentation of the Bryn Mawr Award to Sabin, again with a check for $5,000, was made with the following comments by Simon Flexner, who at that time had retired as director of the Rockefeller Institute for Medical Research:

> Your fruitful years of teaching and research, in which you united a love of work and a love of your pupils, have won you an abiding place in the hearts of your contemporaries and have made you the worthy recipient of this prize.[25,28]

In her response on receiving this award, presented on the occasion of the 50th anniversary of the founding of Bryn Mawr College, Florence Sabin took the opportunity to voice her opinion of "women in science." In reviewing the history of the national movement of women to achieve prominence in, and contribute to, the progress of politics, science, art, and education in this country, we become aware that a certain few were the pioneers who, through their exceptional ability and indomitable spirit, laid the foundation for the recognition and opportunity which exists for women today. Women such as Madame Curie, M. Carey Thomas, Willa Cather, Mary E. Garrett, Florence Sabin, and many others by their example and success proved that women deserve equal opportunity and recognition with men. However, she often said, "It matters little whether men or women have the more brains; all we women need to do to exert our proper influence is just to use all the brains we have."

Sabin felt very strongly about the hurdles which women had to overcome in order to obtain equal rights. She contributed to this movement for emancipation directly by public support and indirectly through success and achievements which earned her public recognition and a number of honorary degrees, influential appointments, and personal awards. Her picture would often be seen with those of other outstanding women of the day in the many articles which were being written in an effort to advance the position of women in the professional world.

Early in 1931 she was chosen for the second time as one of the twelve greatest living women in America.[17] In August of the same year she was appointed to the Advisory Board of the John Simon Guggenheim Memorial Foundation, designed to improve the quality of education and the practice of the arts and professions in the United States as well as to foster research and to provide better international understanding. In June of the following year Sabin received the first National Achievement Award, a medal conferred by the Chi Omega sorority in recognition of a notable achievement by a woman.[20] The honorary degree of Doctor of Science was conferred upon her by New York University, Syracuse University, Oglethorpe University, and Oberlin College.[22-4,26,31] In 1935, Dr.

Sabin was again named as one of the ten most prominent American women by Mrs. Carrie Chapman Catt, pioneer suffrage leader.[29]

Yet despite her growing honors, callers at her laboratory at the Rockefeller Institute were welcomed by a kindly woman, tall and comfortable-looking with greying hair and shrewd eyes, obviously working at the bench with her collaborators, who was never too busy to give them time. The perhaps shy and young visitor would be taken in, shown what was then the exciting "hot box technique," and made to feel a colleague—something that matters much in the early stages of research.

In April of 1939, to the surprise of scientists all over the United States, the Rockefeller Institute for Medical Research enforced retirement rules on its working scientists for the first time and suddenly announced the withdrawal of five of its most brilliant members. These investigators, Phoebus Aaron Theodore Levene, Winthrop John Vanleuven Osterhout, Karl Landsteiner, Alexis Carrel, and Florence Rena Sabin were described as having five of the keenest scientific brains in the world.[125] Thus at the age of 67 Sabin ended her second career.

THE PUBLIC HEALTH PERIOD

1944-1951

Following Dr. Sabin's enforced retirement, she returned to her native state of Colorado. There she lived contentedly with her elder sister, Mary, in a Denver apartment. She was delighted finally to have time to do her own cooking and for her hobby of photography. In the latter she was very accomplished, often making Christmas cards from photographs. With her philosophy that work is a basic requisite for inner satisfaction and that happiness comes only from activity, it was inevitable that she would find an outlet for the enthusiasm and energy which had marked her earlier achievements.

There were those who thought that just another tired old lady had come back to Colorado. She was 67 and looked it, her hair in a bun, her dresses longer than the fashion, her glasses the rimless type popular a generation before. Her neighbors knew, in a vague sort of way, that she had been highly distinguished 'back East.' If they had troubled to investigate, they would have found that this calm, poised, alert, elderly woman, blessed with a strong constitution that had been supported by strenuous summers in the Colorado Mountains, was a neat package of dynamite with more blue ribbons

than one could pin on an ordinary chest. But nobody did look up her record; if anyone had, Florence Sabin probably never would have started on her third career.

It all began quietly in 1944, when Colorado's Governor, John C. Vivian, drew up a list of names for appointment to a Post-War Planning Committee. He showed the list to Frances Wayne, of the *Denver Post,* an ardent feminist. Miss Wayne hit the roof when she saw there was not one woman's name on it. Hastily the Governor asked her suggestions. And thus it came about that the Sub-Committee on Health was headed by Florence Sabin, retired M.D., now aged 73. A very unimportant position—after all Colorado's Rockies were a health resort, so Colorado must be healthy.

Sabin took her new job seriously, as she did everything else. She found herself pitted against a combination of lack of interest, inertia, ignorance, and political power which made public health and preventive medicine in Colorado about as important as a quart of water going over Niagara Falls. Sabin knew that in order to overcome these obstacles she would have to rely on the *people* of Colorado. They had to know how badly Colorado needed public health reforms. So she proceeded to secure the facts beyond all possibilities of argument. The Commonwealth Fund of New York was willing to put up the money needed for the American Public Health Association to enter Colorado and compile the necessary data, but the Fund demanded in return a formal request from the Governor of Colorado to prove that the state really meant to act on the report and not merely to file and forget it. Back to Colorado she went. But delay followed delay. The State House was in no hurry to bring in outside critics. Even a protesting committee drew from the Governor only a weak, noncommittal letter, almost certain to bring rejection. Florence Sabin was not to be brushed off lightly. Her own message, quite apropos, followed the Governor's back East. "Don't let one man's disinterest block the welfare of an entire state," she pleaded.[4]

Out to Colorado came Dr. Carl E. Buck of the American Public Health Association to make a year-long study of the state's health laws and medical facilities. By January of 1946 he was ready to submit his report.[121, 123] It showed that the beautiful health resort, Colorado, actually stood far down the list among the states. Thirty-four had better records for deaths from preventable or controllable diseases. Only two states had worse records in deaths from scarlet fever, only five from diphtheria. Forty-one states had better records

than Colorado on diarrhea-enteritis deaths and pneumonia fatalities, and forty states had lower infant mortality rates.

In the five years from 1940 through 1944, 14,622 Coloradans had died from controllable and preventable diseases. In half a decade, 8,245 Colorado citizens had died needlessly, for every one of the "preventable" deaths was unnecessary, and at least half of those who died from "controllable" causes could have been saved. This added up to more than three times as many as Colorado lost in the armed forces during the entire war!

Buck stated that Colorado was giving its Division of Public Health less than ten cents per capita to protect the health of its citizens. All the rest of its pitifully small public health expenditures were coming from federal aid, from the United States Public Health Service, and the Children's Bureau. The state appropriations were but 14 per cent of Colorado's total health expenditures.

A major factor was the political control of the State Health Division. The Civil Service Commission, itself a political barrier, had been blocking the appointment of qualified health officials. Six of the principal administrative positions in the state's puny health agency were vacant, and the salaries in surrounding states averaged 26 per cent higher than in Colorado. Dr. Buck discovered that only five of the sixty-three counties had local health departments, and three of these were without full-time health officers.

Most localities never had undertaken the health-protecting functions that are present throughout the United States. There was found to be no effective control of the milk supply because the Health Division had no authority to regulate milk production or dairy herds. Only two counties and nine towns in the entire state were operating under the Standard Milk Ordinance of the United States Public Health Service. Only 16 per cent of the communities had modern sewage systems, nearly half had no systems at all, and the rest had systems incapable of purifying sewage before it was dumped into the streams to pollute irrigation waters and contaminate truck farm crops. Buck also discovered that the state's available hospital beds for the citizens of Colorado afflicted with tuberculosis numbered only 574, less than half of the minimum required.

Nobody could contradict these facts. The next move was to rouse the citizens of Colorado. Paying expenses out of her own pocket, Sabin begin to tour the state, hammering home the grim meaning of the Buck Report. In the larger cities she spoke to packed halls. But she never refused an invitation, even when it meant crossing the Rockies to address a handful of people in some

back-valley village. She used slogans and established a statewide campaign: "Politics, Pasteurization, and Pollution—Health to match our mountains."[126]

In November of 1946 she was scheduled to speak at the little town of Sterling, 125 miles away from her Denver home. At daybreak, Herbert D. Moe, Executive Secretary of the Committee on Health, phoned to say there were eight inches of snow and to suggest the meeting be canceled. Her answer was, "Meet me at nine—and don't forget your rubbers." By the time they started, the state highway patrol was broadcasting warnings to all cars to get off the roads. Again Moe tried to give her an excuse, proposing to speak in her place. "If you can make it alone, you can make it with me," she snapped.[4]

"There she sat," Moe related admiringly, "with a shawl tied over her head, like a quiet little old grandmother on her way down the street to tea. It was 1:30, with the snow near our hubcaps, before we reached Brush. 'Thirty miles to go,' I said, making a last try at getting out of it. 'Well,' she answered, looking calmly at her watch, 'we've still got 30 minutes. Let's make it.' "[4]

It was at such meetings that Sabin did her most effective work. After a lifetime of cloistered and often lonely scientific research she demonstrated—much to her own surprise—an amazing ability to open hostile minds, to win people over almost against their will. State Senator Price Briscoe tells how she recruited her committee:

> I was just an ex-Senator minding my own business and running a gold mine when Dr. Sabin came tromping in here one day last Spring. I'd never heard of her before, but they phoned and called me down to the drugstore in Idaho Springs. There was a little bump of a woman with a twinkly sort of smile that made her eyeglasses seem to light up. She looked so tiny and ineffectual, sitting on a high stool at the soda fountain. We ordered two cokes and she started to talk. We had two more, and then another round. She must have spiked mine because before I knew it, I had promised to work on her committee—and look at me now!
>
> I'm back in the State Senate, diligently neglecting my business. I spend half my time at health meetings in Denver, and half the rest rooting things up elsewhere for the little lady. Neighbors are beginning to console my wife when they find her alone, as if I had a girl friend down in the city. And I'm not the only one. Dr. Sabin has scores of people just like me, who've caught the torch for something that nobody ever could have gotten us excited about before.[4]

Thus, touring the state, the mining villages, the college towns, the short grass country, and the isolated Western Slope, Sabin and her committee built up a wave of public indignation which toppled many anti-Sabinites from their high public positions. The million-

aires of Colorado Springs and the poorest itinerant beet pickers could be found fighting side by side. DAR Chapters, farmers groups, chambers of commerce, and welfare organizations all joined the campaign. Newspapers picked it up. Parent-teachers organizations contributed by printing and distributing 70,000 folders on the Buck Report and the Sabin program.

During the next state elections, both gubernatorial candidates spent half their time protesting that each was more strongly for Sabin's health program than the other. In county after county, assembly and senate candidates who tried to pussyfoot on health legislation went down to defeat while newcomers who endorsed the Sabin proposals were elected.

Lee Knous was elected the new Governor of Colorado. Every campaign speech had stressed his support for the health bills. Knous was a Democrat who ousted a Republican administration despite Republican landslides almost everywhere else. When asked how he expected to pass such bills through a legislature controlled by his political opponents, he replied: "Brother, when it comes to those bills . . . why, I'll have the little old lady on my side. There isn't a man in the legislature who wants to tangle with her. She's an atom bomb. She's a dynamo."[4]

Sabin insisted that her main job had been "to take health out of politics." But actually she had succeeded in putting politics right into the middle of the health picture and politicians out in the open where they had been forced to take a stand. As Albert Q. Maisel put it, in his article on Sabin's public health career:

> It was Sabin who held the shotgun for the "shotgun wedding" of the Civil Service Commission and the State Board of Health. The civil service people had acknowledged their past failures and promised to do better in the future. The health people had agreed to submit new job specifications and salary recommendations. And both groups started busily plotting a joint campaign to force the legislature and the Governor to come through with bills and a budget that would make it possible to secure long-needed, qualified personnel. After it was all over, one of the civil service men shook his head and muttered, "Hot damn, that woman is wonderful. She sits there so quiet you get to think you're dealing with Whistler's Mother. It's only after you have gone home that you realize you have promised her your coat, vest, and shirt."[4]

The medical profession opposed Sabin when they discovered they could not have a majority of the members on the proposed new State Board of Health. Sabin convinced them that it might be more democratic and certainly more palatable to the legislature if they would be content to cooperate with laymen instead of dominating

the picture. Dairy interests, which had defeated most of the public health proposals in past years, were prepared to veto any proposal that the health committee offered. Much to their surprise, they found the Sabin group discussing a bill for cattle inspections, pasteurization, and vaccination which the committee hoped the cattle men would sponsor as their own. Even more to their surprise, they left the meeting having promised to do so. Old-line politicians, who had become her strongest supporters, found themselves continually amazed by the "little old lady." They would try to protect her to make certain that she would still be around to fight for her bills when they came up before the legislature, but often at the end of a long meeting, the protectors found themselves completely worn out, while their idol sat at the head of the table, fresh and smiling.[4]

By 21 October 1946, just two years after Sabin began her task, she had won the warm support of the whole state of Colorado, had nailed health planks into both Democratic and Republican party platforms, had eight model health bills for the upcoming session of the legislature (including one to take health administration from the Governor's control) and had badgered Denver's Mayor Benjamin Stapleton into a promise to "consider" a city health survey.[123]

Of the eight bills presented to the legislature, the first two concerned public health services. The State Reorganization Bill created a new Department of Public Health, with a Board of Health and an Executive Division. The Board of Health was to be composed of nine members appointed by the Governor in such a manner that no business or professional group would constitute a majority. This concession was made by the doctors. The bill gave to the new health department powers adequate to meet its responsibilities in improving the health of the state. The second health bill was permissive legislation for facilitating the setting up of county, city-county, and multiple-county health units. Both of these bills passed early in the session.

The third bill, with appropriations for all divisions of government, was presented late in the session. The requests were in two parts: one for the State Department and the other for aiding county units. These bills were given intensive study by the appropriations committee and, though no group obtained all it asked for, the health department received funds adequate for great improvement of its services. The grant for state aid to the counties was raised from nothing to $150,000 for the biennium.

The fourth bill was an enabling act to meet the federal requirements for participating in the new hospital construction program.

The fifth bill was an appropriation bill for the medical school. Under the new Dean, Dr. Ward Darley, plans had been developed to stress public health and the training of more general practitioners rather than specialists. These plans were an important advance in medical education and the committee was glad to endorse this program.

Three special bills pertaining to specific diseases were also submitted: two were to lessen the incidence of tuberculosis, the third was to decrease the frequency of Bang's disease in dairy cattle. The bills in regard to tuberculosis were drawn by the State and Denver Tuberculosis Associations and endorsed by the Health Committee. An increase in the per diem allotment to hospitals of from $4 to $6 for the care in indigent cases was obtained. It was hoped to secure money for the construction of a new wing of 100 beds at the Colorado General Hospital under the direction of the Medical School, but support was won for a 30-bed ward only. This did, however, aid in the development of chest surgery in the state, place a number of tuberculosis patients in a general hospital, and help with the training of medical students in this disease.

The so-called Cow Health Bill was the only complete defeat of the committee. It was drawn by a veterinarian on the committee in the effort to check the sale of dairy cows that are reactors to Bang's disease. It did not include compulsory testing nor require slaughter but simply the quarantining and reporting of infected cows. The bill was killed by the livestock interests through having it referred to the Livestock Committee, where it was permanently buried. Colorado's important beef and dairy cattle industries made the eradication of Bang's disease unusually difficult. The inter- as well as intra-state shipment and sale of infected animals complicated control measures. This disease, at that time, was a national problem. Some of the questions that needed further investigation were: How could you account for the fact that a cow may react negatively to the agglutination test and at the same time show a positive blood culture? How effective was calf vaccination?

Again using undisputable facts and figures, Sabin showed the tremendous losses each year in the cattle and dairy industry in Colorado due to diseased animals. The data on losses were so impressive that it was not too difficult a task to convince the dairy industry that preventive measures pay in terms of increased dividends. The Governor appointed a special committee with representatives of the livestock industry, of the dairy groups, of the

veterinarians, of the public health forces, and of the public to make a study of the best possible control measures for Bang's disease.

The second problem which needed study was the lack of public health personnel. During the next few years Sabin attempted to solve both of these problems in the hope that Colorado's Public Health Department would be rid of vulnerable positions. In attacking this problem, Sabin attempted to get the state to increase appropriations for education and research so that the University of Colorado's School of Medicine could build additional laboratory facilities and increase its medical student body. Sabin also made known the need for more nurses and more sanitary engineers in an effort to supply adequate personnel to the public health department. It was not until December 1951 that the Florence R. Sabin Building for Research in Cellular Biology was completed and dedicated at the University of Colorado Department of Medicine in Denver. Her colleagues honored her at the dedication dinner and presented her with a bound volume of felicitations from all parts of the country.[49] The funds that were contributed for the erection of this building came from many organizations, some of which were national. Even Sabin herself contributed financially in addition to giving many hours of work to convince the public that such a building was absolutely necessary.[121]

Because of her achievements, Sabin was elected President of the Western Branch of the American Public Health Association and President of the Denver Board of Health. In October 1947 she was unanimously elected an Honorary Fellow of the American Public Health Association.[118]

The Public Health Period also brought to Sabin her usual individual recognition. In 1945 she had received the Trudeau Medal of the National Tuberculosis Association, the highest honor in the field of tuberculosis, for her "meritorious contribution to the cause, treatment or prevention of tuberculosis."[32]

In 1947 she was awarded the Jane Addams Medal at the 100th Anniversary Celebration of Rockford College. The medal, presented for the first time, was in recognition of her "untiring achievements" in Colorado public health work.[38] During the same year Sabin received the American Woman's Association medal for eminent achievement and the science citation of the National Conference of Christian and Jews.[40] In 1951 she received the Lasker Foundation Award for her achievements as a leading spirit in public health programs in Colorado and the General Rose Memorial Hospital's medal for distinguished public health service.[49]

The year 1951 brought to a close the third, and last, of Sabin's careers. At the age of 80 she retired once again to her Denver apartment. If she had been asked to tackle another problem, she would have undertaken it willingly and without doubt successfully, for throughout her life she had exhibited the qualities, the energy, and the vision which almost unfailingly guarantee success.

IN MEMORIAM

In January 1953 Sabin received the Elizabeth Blackwell Citation of the New York Infirmary in honor of her life's work—three careers, each productive, influential, successful, and each resulting from original ideas combined with intellectual integrity, boundless enthusiasm, and tireless energy.[44]

Success is difficult to define, for it conveys different meanings in different circumstances. But to Sabin, success meant that there was still time to accept a new challenge. Each challenge was an adventure for her, and each adventure met with further success in some degree.

She was more than a scientist, she was a woman who loved humanity: "A time will come when men and women will live their allotted span quietly, peacefully, without illness, free from pain, until they pass gently, as a tired child closes sleepy eyes, from this world to the next." Her words embody her credo, an aim toward which she devoted her life.[117]

And these words also characterize her death. Florence Rena Sabin lived to the age of 81, "peacefully, without illness, free from pain," and on Saturday, 3 October 1953, died at her Denver home following a heart attack.

If she had had the choice, she would have lived her life over again exactly as it was, doing just the same things. That, without her suspecting it perhaps, was the final seal of success upon her life. She had moved in her chosen road to a chosen goal with her every effort. Simon Flexner had called her "the greatest living woman scientist and one of the foremost scientists of all time."[48] In 1956, a statue was placed in Statuary Hall in the Capitol in Washington in honor of Florence Rena Sabin, Teacher—Scientist—Citizen.[131]

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Hogarth's Anatomical Theatre

WILLIAM BROCKBANK* and JESSIE DOBSON**

WILLIAM Hogarth's gruesome dissection scene is the fourth and final stage in the series entitled "The Reward of Cruelty." He himself described the event as taking place in the Surgeons' Hall, and with the passage of time the drawing has been accepted as a picture of the interior of the anatomical theatre of the College of Surgeons. The statement was repeated in a recent issue of this journal (1957, *12*, 338).

There are three obvious reasons why the theatre cannot be attributed to the Surgeons. The new Surgeons' Hall was not finished when the drawing was made. The Presidential chair bears arms based on those of the Royal College of Physicians.[5] The royal crest is shown. The surgeons had to wait half a century after the drawing was made before they received their royal charter.

The engraving of Hogarth's drawing is dated 1 February 1751. It was originally cut on wood by J. Bell a year earlier. The Surgeons had separated from the Barbers in 1745. In doing so they lost the use of the theatre attributed to Inigo Jones as an extension of the Barber Surgeons' Hall and opened in 1638. It had been built for nearly £1,000 exclusive of the cost of digging for the foundations which the company did by using their own labourers at the modest cost of "16 pence a day each, plus one penny a day breakfast money." The original plans of the theatre are in existence in Worcester College, Oxford. It was elliptical in shape, roughly 40 feet long and 30 feet wide. The staircases giving access to the seats were outside the theatre in two square turrets on either side of the entrance façade giving the maximum amount of room for seating. Inside there were four rows of seats with an open sector opposite the door for the entrance of the Master and others on ceremonial occasions. The seats, railing, and doors were all made of cedar wood. The seats were carved and the wall adorned with the signs of the Zodiac. There were niches and brackets for skeletons and other anatomical preparations including the skeleton of an ostrich and a bust of King Charles I. It was the first building designed specifically as a permanent anatomical theatre. After the separation

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of the Barbers and Surgeons Companies it remained unused until it was pulled down in 1784.[8]

At the time of the break the Surgeons asked leave to rent the theatre, dissecting room, and gallery for a guinea a year until they could provide their own. This impertinence was matched by the Barbers who suggested that the rent should be £80 a year, and that the Surgeons should pay £100 towards the cost of the enquiry arising out of the cleavage of the two bodies. Neither would give way, with the result that the negotiations for renting the theatre fell through and for some years no anatomical lectures were given.[7]

The Surgeons built their new hall close to Newgate Gaol. It was brought into use in August 1751, six months after the date of the engraving. It was not an imposing structure. Its theatre was octagonal in shape with niches intended for the skeletons of notorious criminals. Two drawings exist which show a fairly spacious room with a very prominent surrounding balcony and no obvious windows. The one shows the body of a murderer exposed to public view and the other—a water colour drawing by Rowlandson—depicts a lecture in progress. It was in existence but not in use at the time of Hogarth's drawing. It is clear that this is not the theatre of the engraving.

There is good evidence to believe that in this scene Hogarth represented, with some adornments, the Cutlerian theatre of the Royal College of Physicians in Warwick Lane. This building replaced the former premises that had been destroyed in the great fire of London. It was designed by Robert Hooke,[2,4] not, as is frequently stated, by Wren.[1] It, too, abutted on Newgate Gaol and took several years to build. It was opened without any particular ceremony in 1674 and served the College for a century and a half. There was a paved quadrangle entered from the street through an archway beneath a domed octagonal building which is our own particular interest and which was known as the pill box because of the golden ball that surmounted it. The pill box was in fact the anatomical theatre, the interior according to a contemporary writer being

> one of the best imagined for seeing, hearing and classification of students and Fellows and for the display of anatomical demonstrations upon a table in the middle of the arena of any building of its size in existence. It is a perfect study of acoustical and optical architecture. The roof and forms are well adapted for the distribution of sound and the elevation and arrangement of the seats with the separate stairs for Fellows and Members so well designed. The effect of the lantern is everything that can be desired affording light and ventilation and excluding rain in a very efficient manner.[1]

FIG. 1. The fourth picture in the Reward of Cruelty series.

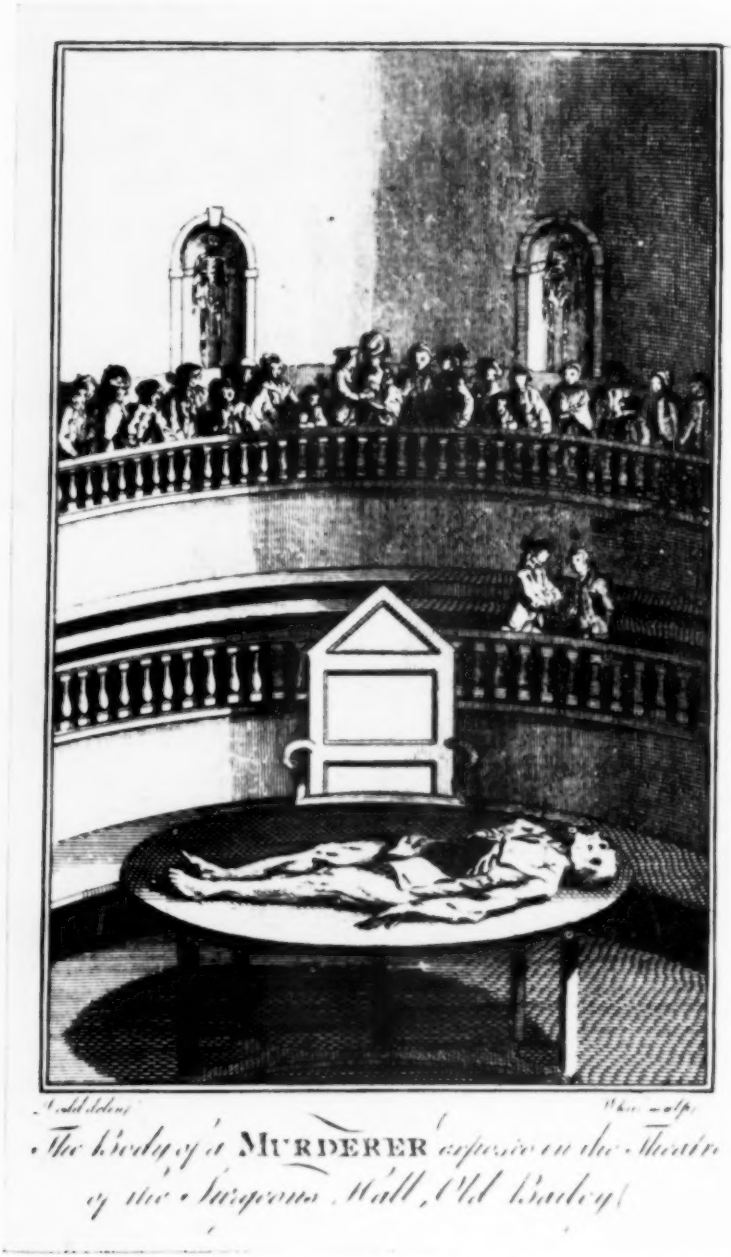

FIG. 2. The body of a murderer exposed in the theatre of the Surgeons' Hall.

FIG. 3. Robert Hooke's anatomical theatre at the Royal College of Physicians in Warwick Lane.[6]

Fig. 4. Elevation of Hooke's theatre.[1]

It was forty feet in width and was furnished with six circular rows of seats, one above another. There was a central area where three chairs were placed for the President, the Dissector, and the Demonstrator. We are told that it was much admired.[1] The cost of its erection had been provided by a wealthy and ambitious London merchant, Sir John Cutler, and it was named after him.[1]

FIG. 5. Plan of Hooke's theatre.[1]

Hogarth's drawing shows the Fellows in the front row and the students and others behind. There is no sign of a gallery, but the idea of the skeletons of two executed criminals and their niches was borrowed either from the theatre in the Barber Surgeons' Hall or that in the newly erected, but unused Surgeons' Hall. Horace Walpole was not far off the mark when he referred to the engraving as representing the anatomical theatre at "The Royal College of Physicians and Surgeons."[3]

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The Hidden Political Allusion in a Dental Etching by Francisco de Goya (1745-1828)

CURT PROSKAUER*

WHEN the writer many years ago reproduced and described in *Iconographia Odontologica,*[1] "Al Conde Palatino" (Fig. 1), plate 33 of the 82 aquatint plates, entitled the *Caprichos* by the famed Francisco José de Goya y Lucientes, he saw in this etching nothing but a realistic representation of a dental extraction, similar to various works by seventeenth and eighteenth century Flemish and Dutch genre painters, depicting an exciting technical process.

The caption of the etching, Al Conde Palatino,[2] was variously translated in the *Iconographia Odontologica* as "Comes Palatinus," "Gaugraf," "Pfalzgraf," and also, with allusion to the activity depicted, as "Kaugraf," "Gaumengraf"—a pun, since "palatino" can mean either "palatial," belonging to the palace, or "palatal," pertaining to the palate. These translations were reasonable enough if nothing more was represented in the picture than dentistry; at the time, no other interpretation of the aquatint occurred to me.

Harry B. Wehle[3] believes that "Count Palatine" was a name assumed by a charlatan toothpuller in Madrid; this opinion is likewise expressed by the Parisian dental historian, Georges Dagen,[4] who says the engraving may have been dedicated to a charlatan who masqueraded as a count or whose name was a deliberate deformation of "palatino." Jean Adhémar[5] thinks that Goya "perhaps intended to represent" in the figure of the "quack doctor dressed as a Count Palatine the Minister Urquijo," but he gives no plausible proof to support this theory. He was, however, the first to suggest that the picture might be a veiled portrait of some political personality.

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1 Proskauer, Curt. Iconographia odontologica. *Kulturgeschichte der Zahnheilkunde in Einzeldarstellungen,* vol. 4. Berlin, Hermann Meusser, 1926.

2 In the first edition of the *Caprichos* in 1799 the word *Palatino* was erroneously (?) engraved *Patalino.* It is also possible, however—the reason will be seen later on—that Goya intentionally misspelled the word so as not to be too readily understood.

3 Wehle, Harry B. Fifty drawings by Francisco Goya with commentary. *The Metropolitan Museum of Art Papers No. 7.* New York, 1938 (2d ed., 1941).

4 Dagen, Georges in *La Semaine Dentaire,* 29 juillet 1923, 5, 722: *"Eau-forte dédiée peut-être à un charlatan se faisant passer pour comte ou dont le nom est une déformation voulue de 'palatin.' "*

5 Adhémar, Jean. The caprices of Goya. *Bibliothèque Aldine des Arts,* vol. 2. Fernand Hazan [1951], p. [88].

In any case, the wording of Goya's caption "*Al* Conde Palatino" indicates that it must be not a descriptive title but a dedication *to* a person. Who is this Conde Palatino? What rôle does he play in the etching? Why did Goya dedicate this picture to him?

When we realize that, for good reasons, Goya had purposely veiled the meanings of the short *Caprichos* captions, as well as the longer handwritten commentaries accompanying the pen-and-ink or sepia sketches from which the *Caprichos* etching were made, we cannot rest satisfied with their seeming innocuousness. All the biographies of Goya and all the art histories dealing with this master's life and work agree that most of Goya's creations, especially the *Caprichos,* are merciless comments on the cultural and political life of his time—the second half of the eighteenth and the first quarter of the nineteenth century. The Spanish King, Charles IV, appointed Goya "Court Painter" and Director of the Academy. With ruthless realism, amazing frankness, and outrageous daring, the artist in his drawings, etchings, and paintings satirized the corrupt court, often with a mere allusion to the person he wished to attack or ridicule—and he got away with it. This was not meanness or malice, it was a genuine hatred of political tyranny, a moral impulse to interpret the world around him, to expose human error and foolishness and the vice prevalent among the degenerating Spanish aristocrats. His work holds up a mirror to a troubled period in European history and illuminates, as does no other record, its terrible misery. As well-paid official court painter, Goya was dependent on the patronage and favor of a weak, stupid court and its grandees. He had to be careful not to bite too openly the hand that fed him and still more careful not to deliver himself into the hands of the dread Inquisition, hence his ambiguous, cloaked captions and commentaries designed to mislead.

Goya also thought of another effective device which, strangely enough, has not been mentioned by any art historian. In his masterpiece "The Family of Charles IV" (Fig. 2), Queen Maria Luisa stands at the center of the painting bedizened with jewels, including large pendant earrings and a large showy diamond arrow in her hair. In another of his paintings, small and less famous, "The Old Woman" (Fig. 3) (now in the Musée de Lille, France) we find a similar pair of earrings and, what is more striking, the same diamond arrow in the hair of a frightfully ugly old hag, a harridan. With this clever use of "accessories" Goya at once identifies the Queen with the old woman; thus he is able to ridicule and defame the old Queen who, Mme. Junot declares in her *Souvenirs d'une*

Ambassade en Espagne et au Portugal,[6] "could not take the plunge of growing old"—a woman temperamental to excess, bursting with ill-restrained desires, absurdly carrying on with young lovers chosen from his Majesty's bodyguard after a long series of aristocratic amours. Thus Goya, a master at suggesting a face yet leaving it anonymous, could always deny that any figure in a drawing or painting represented a real person. But to be absolutely safe, the artist announced his *Caprichos* in the *Diario de Madrid,* 6 February 1799, as "A Collection of Prints of Capricious Subjects, Invented and Etched by Don Francisco Goya. Since the artist is convinced that the censure of human errors and vices . . . may also be the object of Painting, he has chosen as subjects adequate for his work from the multitude of follies and blunders common in every civil society, as well as from the vulgar prejudices and lies authorized by custom, ignorance or interest, those that he has thought most suitable matter for ridicule as well as for exercising the artificer's fancy. . . . One would be assuming too much ignorance of the fine arts, if one were to warn the public that *in none of the compositions which form this series has the artist had in mind any one individual, in order to ridicule particular defects.*[7] *For truly, to say so would mean narrowing overmuch the boundaries of talent, and mistaking the methods used by the arts of imitation in producing perfect works.*"

The tragicomedy of this announcement was that—by operation of the French law of human nature "Qui s'excuse, s'accuse"—the *Caprichos* were on sale only two days when Goya was forced to withdraw the album from circulation because dangerous gossip was spreading to the effect that the aquatints were a kind of *roman à clef.* The Inquisition was kept at bay only by the King's declaring that they had been royally commissioned. Goya ingeniously presented the etchings, together with the copper plates, to the Royal Chalcographic Institute, on the pretext that he wished to safeguard the *Caprichos* against falling into foreign hands after his death. In return His Majesty granted an annual stipend of 12,000 reales to Goya's 19-year-old-son, who wanted to study painting abroad. All this was supposed to prove—in the interests of the Court as well as Goya's—that no satire on the Royal family, any of the Grandees, or the Church had been detected in the *Caprichos.* No one could now discover a personal or political allusion in the aquatints without danger of offending the Court or the Church, since the Catholic

[6] Chastenet, Jacques. *Godoy. Master of Spain 1792-1808.* London, 1953, p. 125.
[7] The italics are ours.

Al Conde Palatino.

Fig. 1.

FIG. 2.

Fig. 3.

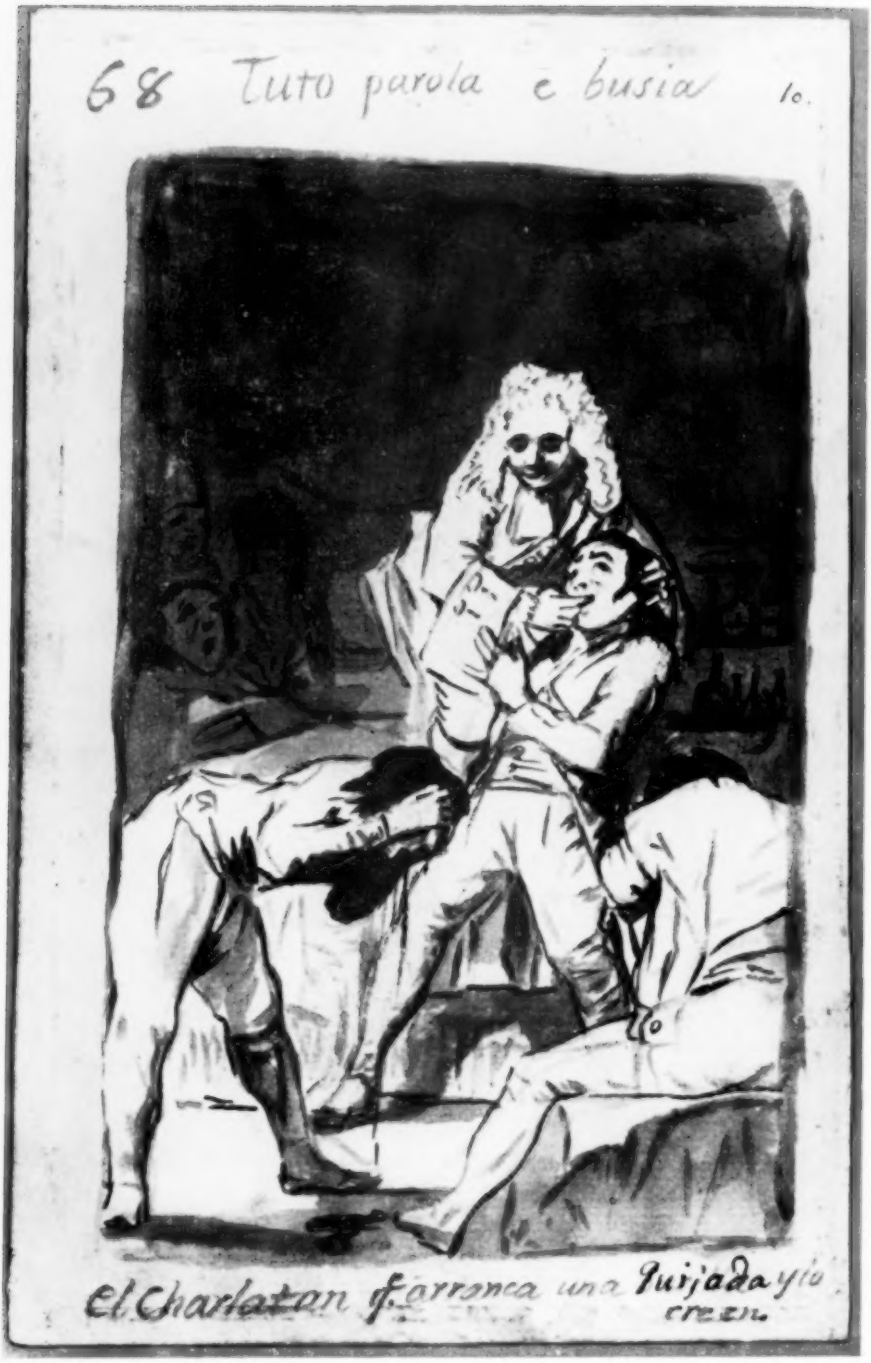
68 Tuto parola e busia 10.
El Charlatan sf. arranca una muijada y lo

Fig. 4.

FIG. 5.

King himself had approved the *Caprichos,* and Goya had expressly denied any such intention.

Like most artists, Goya had a sketchbook in which he drew scenes from life. The Metropolitan Museum of Art in New York has parts of this so-called Sanlúcar sketchbook, which also contains the ink drawing that served Goya as a study for the "Al Conde Palatino" (Fig. 4). On seeing this sketch, the writer was surprised to note that certain changes had been made in the later etching which could not have been dictated by esthetic principles, such as elimination of confusing details, or change in position or pose of the figures for the sake of a better balanced composition. Here the changes must have been made for another reason. Goya had transformed the picturesque peruke of the toothpuller, whose performance he had perhaps seen on some street corner, into bushy hair, the modest coat had become a luxurious jacket, splendidly embroidered with glittering gold lace on the cuffs and along the edges, and he had hung the gold ribbon of some order around the neck. The costume now looks like the uniform of the Spanish grandees and high military officers. The shining order and luxurious costume are not so remarkable when we remember that in many paintings and etchings of the sixteenth, seventeenth, and eighteenth centuries the dentist is theatrically rigged up in much the same way. What is most suspicious, however, and what throws light on the whole mystery, is the striking resemblance between the tooth-puller's changed costume and coiffure and the coiffure, embroidered uniform, with cross and ribbon, of the Spanish Generalissimo, Prince of the Peace, Don Manuel Godoy, portrayed elsewhere[8] by Goya on a large canvas (Fig. 5). Here, too, the artist seems to have used his clever "accessories" trick to hide the quack's true identity.

Who was this Manuel Godoy and why did Goya attack him? Briefly, Godoy, son of an Extremadura country squire, had risen from a handsome, young guardsman of His Majesty—by way of the King's weakness and stupidity and the dissolute Queen's bedroom—to Private Secretary to the Queen, Protector of the Noble Arts of San Fernando, Duke of Alcudia, Grandee of Spain, Knight of the Order of the Golden Fleece, Prime Minister, and Prince of the Peace—a title the Scriptures had bestowed on the Messiah.[9] Driven only by lust, ambition, and greed for money, never by patriotism, Godoy had thus quickly reached the highest rank attainable in Spain; for sixteen years he was in effect absolute monarch of Spain

[8] In the Academy San Fernando, Madrid.
[9] Chastenet, p. 68.

and the Indies, the King having virtually surrendered to him full power. Godoy collected not only titles and state offices which carried with them large emoluments, he also collected enormous sums from the Spanish people by squeezing taxes from them, much of these going into his own pockets. Whenever money changed hands, he saw to it that some stuck to his own fingers. The poor boy who had come to Madrid with an empty purse had, in a very short time, amassed an unbelievably large and ill-gotten fortune; it was said to exceed the fabulous wealth of the Indies.

In a word, Godoy was a crook, and his intellectual and political abilities were meagre, as we learn from the political reports of French diplomats:[10] "I doubt his having much moral courage; his talents are very ordinary and in the matter of candour he is not above suspicion." This report comes from another emissary: "Godoy makes claim to being a great man; but anyone who has talked to him twice, and realized the extent of his ignorance, cannot but wonder at seeing the whole of Spain at his feet." A third report reads: "Unable as I am, to recognize in Godoy either a great minister or a clever politician, his rise is due in my view not to his being *a statesman* but to his being a parvenu."

His tax extortions and his extremely immoral life made him hated not only at home, but the Pope also cherished a hope that the scoundrel's misdeeds and crimes would finally be cut short. Street loiterers spat on the ground when Godoy's carriage passed, monks crossed themselves, a gesture of exorcism, as soon as he turned his back. Obscene songs and scandalous stories circulated. The all-powerful Manuel was nothing but an unscrupulous adventurer, a flouter of laws, divine and human, an enemy of the nation. Such is the man whom Goya represents in his etching as a toothpuller, a quack who gets everything he can out of a man and drains his life-blood while he is at it.

Now we see the real significance of Goya's toothpuller as many of his contemporaries certainly saw it. And when Goya realized that the true meaning of this plate, and of most of the others in his *Caprichos,* was no longer a secret, and that he was running more danger than he wished, he invented all sorts of explanations. On his preliminary drawing he wrote: "Tuto parola ẽ busia—el Charlatan q° arranca una quijada [barilla] y lo creen." ["Every word is a lie, the charlatan that pulls out a jawbone and they believe it."]

10 Chastenet, pp. 164, 118, 150.

With this "commentary" or "explanation," Goya did not, as Lopez-Rey[11] believes, make "easier for others the task of understanding his work" but, on the contrary, clothed in still greater obscurity—as indeed he intended—the figure of the "Conde Palatino." With his "commentary" he puts the spectator on a false but perfectly safe track.

Another of Goya's "explanations" of this plate reads as follows: "In every science there are charlatans who, without having studied a word, know everything and have a cure for everything. Do not believe what they proclaim. The true scientist is always mistrustful of positive statements. He promises little and accomplishes much; but the Count Palatine accomplishes nothing that he promises."[12]

These lines are also a smoke screen, but in them we hear described the ignorant political charlatan Godoy, who like all dictators promises heaven on earth and brings hell instead.

11 López-Rey. *Goya's caprichos, beauty, reason and caricature.* Princeton University Press, 1953, p. 85.

12 En todas ciencias hay charlatanes que sin haber estudiado palabra lo saben todo y para todo hallan remedio. No hay que fiarse de lo que anuncian. El verdadero sabio desconfía siempre del acierto; promete poco y cumple mucho; pero el Conde Palatino, no cumple nada de lo que promete.

An Historical Study on Theories of the Placenta to 1900*

FOSTER DE WITT**

"The whole subject is of interest as being a definite theory, even if prescientific about the nature of an easily observed biological phenomenon, namely, the placenta."

Joseph Needham
A History of Embryology

I. Introduction

IN spite of their importance, the placenta and the fetal membranes were the subject of almost pure conjecture until the time of Fallopius (1523). However, the placenta had a good deal of animistic significance in the mind of primitive man.[36] Mead[31] mentions, but does not elaborate on, the practice of the Arapesh of New Guinea who place the placenta and the cord high in a tree, since they believe that the pig which might eat them would become a garden thief. The Mannus of this same island believe the cord to be endowed with a power for good, while the placenta is evil. One piece of the cord is wrapped with the placenta in a small mat. The mat, with its contents, is then stuck on the wall at the mother's back and thrown away afterwards. J. Needham[34] makes only a remark in passing that certain African tribes show reverence for the placenta. He reproduces a drawing from New Guinea of a "cut-away" view of a gravid woman whose child is seen to dangle in the uterus upside down from a thin cord suspended somewhere internally at the level of the manubrium sterni. It is interesting to compare this with the Hippocratic theories of fetal nutrition.

Ploss and Bartels[36] give a veritable catalogue of midwifery and its superstitions among their contemporary primitive peoples, some rational, the most a product of pure animism. As far as the placenta is concerned, they found the most striking thing was the almost universal concept of this organ as a sort of alter ego, being the symbol for the preservation of good fortune or a talisman in case of danger. A sympathetic animism, as in the voodoo, seems to exist between

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the placenta and the future adult. They cite innumerable instances not only among primitives but in modern Europe.

Typical examples of these beliefs are found in Frazer's *Folk-Lore in the Old Testament*[15] and in M. A. Murray's article "The Bundle of Life" in *Ancient Egypt*.[34]

The Old Testament has an animistic Egyptian conception of the placenta as the container of the King's soul. In the first book of Samuel (XXV:29) Abigail pacified David's wrath against Nabal thus: "Yet a man is risen to pursue thee, and to seek thy soul; but the soul of my lord shall be bound in the bundle of life with the Lord thy God; and the soul of thine enemies, them shall he sling out, as out of the middle of a sling." The Egyptian belief was ritualistic but similar in that the placenta was the embodiment of the external soul in contradistinction to a corporeal soul, and reminiscent of the Icelandic belief[36] that the placenta still contains a part of the child's soul and will only come out if treated well. This belief gained significance when the royal placenta was carried as a symbol before the Pharaoh, a practice continued to the time of the Ptolemies (*ca.* 325-45 B.C.). Also, at least during the fourth, fifth, and sixth dynasties, there existed an office known as the "Opener of the King's Placenta." Needham comments thus: "The term . . . originated from some actual or forgotten ritual king-murder, the bundle of life containing the placenta being ceremonially opened at the conclusion of the reign."

II. Greece and the Hellenistic Physicians

The Pre-Socratic Philosophers

The earliest known attempts to comprehend and explain rationally the significance of the placenta were those of the pre-Socratic Greek philosophers. Bloch[11] and Needham[34] discuss the direction of cultural flux between India and Greece, Bloch believing that the Greeks influenced the Susruta,[41] whereas Needham is noncommittal. So much communication existed between the two civilizations that no definite statement can be made. One is not uncognisant of anthropological and philological evidence supporting the common origin of these two peoples. But the views cited here are, so far as is known, exclusively Greek, due notice having been taken of their possible Hindu or Indo-European origin.

Man's first recorded utterances tending toward a rational interpretation were those of Diogenes of Apollonia (*ca.* 480 B.C.), a

little known and less remarked physician from Ionia. He was the first man known to hold the theory that the placenta is the organ of fetal nutrition.[13] Like many of the pre-Socratic philosophers, Empedocles (*ca.* 460 B.C.) and Democritus (460-356 B.C.) have been forced to depend upon Plato and Plutarch for their literary survival. According to these authors, Empedocles and Democritus held the theory that the fetus feeds and respires by sucking nourishment and pneuma (the Hellenic "vital spirit") through what they called "uterine paps" or the cotyledons of the decidua formed by the sub-epithelial cells of the uterine lining during pregnancy. Bischoff,[9] however, gives a divergent view, claiming for these two the theory of nutrition similar to Alcmaeon's through the amniotic fluid.

The Hippocratic School contributed nothing essentially new to these theories. Hippocrates' writings[22] on this subject are merely a recapitulation of the then current views of conception, nidation, and fetal nutrition. Typical is the theory of the pneuma drawn in by the mother causing the sperm-mass to "boil" up into the human form. The menstrual blood is then used for the nourishment of the fetus, the excess being deposited as amniotic fluid. The umbilical vessels then help nourish the fetus, the growing uterus pressing against the breasts to pump milk into the uterine arteries and back to the uterus and thence to the "uterine paps." Bloch[11] and Fuchs,[22] however, call the authenticity of many of these writings into serious question. Indeed, Hippocrates shares the view of Empedocles and Democritus[38] that the fetus is nourished *per os* in the uterus by sucking on the cotyledons. The one thing correctly concluded was the relationship of labor to the exhaustion of fetal nutrition.[17]

The Socratic Philosophers and Their Followers

Aristotle's (384-322 B.C.) theory of conception and nutrition was, from all evidence,[7,11] his own. The embryo as well as the fetal membranes take form (generative function) from the menstrual blood,[25,7] a fact evident to him from the cessation of menstruation with conception. However, his theory of placental physiology[34] was extremely advanced. From observations in chick embryos, he postulated the nutritional function of the placenta. He argued against the prevalent Hippocratic theories of uterine paps by citing the fact that the fetus is enclosed in membranes which would prevent this method of intra-uterine nursing. He mistook the human placenta as the homologue of the yolk sac and concluded that the

maternal and fetal circulations are in direct connection. He describes these vessels as enclosed by a membrane (umbilical cord) and being in contact with the cotyledons and thereby with the uterine vessels. According to him, these vessels gradually obliterate their lumen as gravidity progresses. Some of Aristotle's discoveries concerning the placenta, namely, the omphaloid "placentation" in sharks[32] were to wait two thousand years for rediscovery and modification.

With one exception, all the physician-philosophers of this era, including Epicurus, Herophilus, Aretaeus the Cappadocian, and Soranus of Ephesus, contributed nothing of permanent value to our understanding of the placenta.[5,10,11,30,34,41] The exception was, of course, Galen of Pergamum (129-*ca.* 200 A.D.). Aside from his major contributions[16] to enlightenment concerning the paths of the umbilical arteries and veins in the fetus and the fetal cardiac anatomy,[3] his chief merit in the present context is that of his powers of synthesis in appealing to the authorities of Hippocrates and Aristotle as the source of knowledge. His description of conception and fetal nutrition is typical: the embryo takes form from the menstrual blood and is nourished by direct connection through the umbilical cord with the maternal blood (Aristotle). The female semen (*flora alba* or coital discharge?) forms the allantois, while the chorion forms through coagulation of the male sperm mass. Neither Valentin, Bloch, nor Needham agree on what Galen meant by the chorion. The secretions of the embryo are two in nature: internal and external. The internal are the bile and mucus. The external are urine and sweat (Hippocrates). The woman is the recipient of the conception, because she is colder, and therefore assures temperate liquefaction and distribution of nourishment to the fetus. The breast and the uterus are "in sympathy" by means of the vessels connecting them, a fact, he assures, established by Hippocrates and confirmed by observation. The amniotic membrane receives the sweat of the fetus, the allantois (which he named from its sausage-like shape) its urine.

III. The Scholastics and the Renaissance

If Galen made a synthesis of Hippocrates and Aristotle, he must have appeared a radical to Albertus Magnus (1193-1280), who is cited here as a medieval curiosity, whose theories were almost purely Hippocratic:[2] "Die Bruest der Frawen . . . haben ein

gemeinschafft mit dem secklin Secundina darinn das kindt inn Mutter leib liget durch ein aederlin das vonn den Bruesten dem Kindt biss an den Nabel gehet . . ."

The Renaissance and the Reformation

Leonardo da Vinci (1452-1519) was the first known author of this era to be familiar with the discoidal placenta, but he mistakenly thought that the human placenta was cotyledonous. He observed that the umbilical veins, as far as he could trace them, ramify in the substance of the placenta and not in the uterus. The placenta is connected but not united with the uterus by means of the cotyledons. He denied intra-uterine lung respiration, maintaining that both nutrition and respiration took place by unknown means over the navel cord.[34]

The first known worker to challenge the Hippocratic and Aristotelian doctrines concerning the nutritive and generative capacity of the menstrual blood was Jean Fernel (1485-1558). Indeed, he believed the menses to be deleterious to the development of the embryo. This is a belief probably extrapolated from abortions in the first trimester, but modern considerations of the relationship of menstruation and implantation would bring this theory into line, since Strauss[40] introduced the thought that conception is the logical order of things, menstruation representing the *pathological* consequence of failure to conceive. Gabriele Fallopius (1523-1562) and Andreas Vesalius (1514-1564),[44] contrary to what one might conclude from the reputation they now rightfully enjoy, made no contributions to basic knowledge of the placenta.

J. C. Arantius (1530-1589)[4,42] introduced an extremely important idea: This was his *a priori* conception of the placenta as the *hepar uterinum,* i.e., the placenta functioned for the fetus in hemopoiesis and blood "purification." Although future researches proved this idea to be exaggerated, it was the first positive theory of the dynamics of placental function. He was also the first to make an emphatic statement, based on actual dissection, that the fetal and maternal circulations are separate. It was a heuristic departure from the stifling influence of Hellenistic theory.

Riolan the Younger (1577-1657) is credited by Valentin[42] with being the first to observe the yolk sac in mammals, and it was A. Spigelius (1578-1625), the student of Fabricius ab Aquapendente and Fallopius, who first determined the direction of flow in the umbilical arteries.[11,39]

IV. William Harvey (1578-1657), His Contemporaries and the Enlightenment

Although the publication of the *Exercitatio anatomica de motu cordis*[20] in 1628 solved no immediate problems concerning the placenta, as with every fundamental discovery it was the catalyst which accelerated the progress of all sciences. Indeed, in spite of his own discoveries, Harvey still believed the fetus to be nourished by the amniotic fluid. Arantius received powerful support for his theory of separate maternal and fetal circulation when Harvey denied the Aristotelian theory: "The extremities of the umbilical vessels are in no way conjoined to the extremities of the uterine vessels by an anastomosis in that white mucilaginous matter, and are quite obliterated in it, attracting nourishment from it." It appears that Harvey regarded uterine milk or decidua as a secretion of the placenta conveyed to the fetus through the navel cord and the amniotic fluid.[20,32]

Another little known contribution which led later workers to fruitful researches was Harvey's reasoning concerning fetal respiration. He shrewdly speculated that the fetus at term can live in the uterus without air, yet die at delivery on compression of the umbilical cord, if it does not breathe. He also thought that substances absorbed via the cord were organogenic, while those of the amniotic fluid absorbed *per os* contributed to growth.

Walter Needham (1631-1691) in his many works[35] gave the first really thorough description of the placenta and the fetal membranes. Aside from his incorrect description of the allantois, Valentin[42] credits him with the observation, description, and correct interpretation of the yolk sac (see Riolan) in mammals. This he termed the *tunica quarta* or fourth membrane.

But these achievements were minor compared to his elaboration of an excellent theory of placental development, structure, and physiology. He concluded that the placenta and cord were the chief vehicles of fetal nutrition, citing by analogy with the chick embryo the manner in which the uterine vessels grow and anastomose in direct proportion to the growth of the embryo. He described the phenomenon of the *chorion frondosum* and *laeve* and made the correct interpretation of their significance in placentation. In fact he had already made Wharton's distinction[34] of a *pars fetalis et uterina* in the placenta. His only real error in description was mistaking the inner layer of the chorion for the allantois.

In considering placental function and circulation he weighed the opinions of Harvey and Everard,[14] the latter believing in the theory of uterine paps and nutrition which W. Needham refuted. He also disputed convincingly with Everard on the latter's theory that the albuminous deposits (uterine milk) in the acetabulae of the cotyledons[32] were identical with the contents of the thoracic duct and the lacteals of Aselli.[21] J. Needham cites a review of a book by W. Needham which he does not name, extremely advanced for its time, on the chemistry of embryonic fluids, in which he compares the contents of the allantois in the chick embryo to urine in its lack of protein.

These theories were a powerful stimulation to "The Invisible College" at Oxford, that group of brilliant young scholars who were forced by the superstitions of their time to conduct their scientific meetings clandestinely. Robert Boyle's (1627-1691) experimentation inspired the young physician John Mayow (1643-1679) to the work which resulted in the publication of *De sal nitro et spirito nitro aero* and *De motu musculari et spiritibus animalibus* in 1668.[21] Mayow's classical experiments involving these nitro-aerial vapors (oxygen) are too well known to be retold here. But the consequences of these experiments and their application to placental physiology were crucial; he argued that the uterus is "naturally adapted for separating aerial particles from the arterial blood." He therefore decided in favor of the opinion that the placenta is the respiratory organ of the fetus and proposed the replacement of Arantius' concept of the placenta as the *hepar uterinum* by that of the *pulmo uterinus*. Armed with these conclusions he was able to refute effectively the belief, at least as old as Empedocles, of intra-uterine lung respiration in the fetus.

Much of the knowledge of this period was consolidated by Nicholas Hoboken in 1675.[23] He erroneously said the chorion and amnion were completely without vessels, but he gave an admirable description of the vessels of the umbilical cord. The dilatations of these arteries are known in the literature as the *noduli Hobokenii*. Valentin also credits him with having been the first to observe the yolk sac in the human embryo (see Riolan and W. Needham).

The Enlightenment

The period of the Enlightenment was dominated by two brothers, John (1728-1792)[24] and William Hunter (1718-1783)[25] in England. One problem which returned again and again in this period was the nature of the connection between the fetal and ma-

ternal circulations. Camillis Falconet (1671-1762)[18] performed an experiment designed to show that the maternal blood did not represent the source of fetal nutrition. What he succeeded in confirming was the views of Arantius that these circulations are separate. He simply bled a gravid dog to death. According to the theory of a direct connection between the fetus and mother, the fetus should have died of exsanguination. The vessels of the fetus were, however, still full of blood. Another worker, Francis David Herissant (1714-1773) called attention[18] to the arterialization of the blood in the umbilical veins. His purpose was to prove that the placenta had only respiratory and no nutritional function for the fetus. His contribution explained some of the paradoxical relationships of fetal circulation (see Spigelius).

William Hunter was the first to give a sophisticated description of the human placenta. He described the relationship of the parietal and capsular deciduae and their changes undergone during pregnancy, calling them the *membrana decidua vera* and *reflexa,* respectively. He injected the fetal circulation to determine the nature of its relation to the maternal vessels. His results confirmed Arantius. He observed the yolk sac and made a correct interpretation of its significance. His brother, John Hunter, was more famous in other fields,[24] but his observations were valuable in the formation of later theory, namely, the origin of the decidua. By consideration of the formation and maintenance of the decidua in ectopic pregnancy and of the nongravid member in cases of pregnancy in the bicornate uterus, he concluded that the decidua was a product of the uterine mucosa. He also suggested that the chorion was the essential organ in placentation, attached through the nutritional connection of the allantoic stalk to the embryo. His words were prophetic of Minot.

V. The Nineteenth Century

The Functions and Structure of the Placenta

John Hunter had made a shrewd observation, but Valentin's classic *Embryology* of 1835 shows the abundance of confusion concerning the origin of the decidua. The direct heirs of J. Hunter's theory of the decidua were Oken (1779-1851),[8] Jörg and von Baer.[27] Bojanus (1776-1827)[8] had already proposed the presence of a third member of the decidual membranes, the *decidua serotina* or *basalis.* Sandifort (1777) and Blumenbach (1798)[42] believed the decidua was absent over all three uterine orifices by way of argu-

ment in favor of J. Hunter's theory, while Meckel The Younger believed the decidua covered at least the internal orifice of the cervix. Oken, von Baer, Jörg, and Seiler[9] believed the parietal decidua to be loosened, partly metamorphosed uterine mucosa; W. Hunter believed it to be uterine mucosa without metamorphosis, in the nature of an inflammatory exudate.

The physiological theories of the decidua were equally diversified, but Burdach[42] and Velpeau[43] believed that it represented a nesting place for the ovum without specious reference to its analogues or homologues in oviparous animals, and Breschet[42] proposed that it did not represent simply a place of mechanical attachment, but the means of establishing a dynamic exchange between embryo and uterus, until the former might complete its placentation, this being accomplished most likely through the principles of ex- and endosmosis.

Associated with these problems was the nature of implantation. There were two major theories: one was Burdach's inversion (*Einstülpung*) theory;[42] the ovum mechanically insinuated itself between the layers of the decidua without actually entering the uterine cavity, depending therefore on Meckel the Younger's theory that the decidua covers the tubal orifices. Its active supporters included Bojanus, Velpeau, and Nägeli,[9] but was opposed by Bischoff.

The other theory was the propulsion (*Einsaat*) theory of Valentin which, except for its purely mechanical pushing aside of the decidua, was quite similar to the modern histolytic theory. Among its originators and supporters were W. Hunter, Meckel the Younger, Carus, and Heusinger.[42] Valentin himself believed correctly that a type of decidua existed before implantation, and that it did not cover the uterine orifices. Denman and Evrat[26] proved the pregravid existence of the decidua by the fact that in states of sterility a pregravid decidua without an embryo may often be expelled, and that a "decidua-like" structure is seen in the premenstrual virgin uterine mucosa. However, Ercolani[28] followed Chaussier's lead in insisting that the decidua is a new formation and not a direct derivative of the mucosa. Kölliker[28] and Minot[33] rejected this in no uncertain terms, and Minot himself observed prophetically the "action of the ovum at a distance" on the premenstrual or pregravid uterine mucosa.

Other problems of placentation arose from the new microscopic technique. Von Baer believed that the *corona radiata* (his *discus proligerus*) of the ovum was the future chorion, but Bischoff was

able to separate its cells from the ovum by microdissection. Bischoff, however, persisted in referring to it as the *Keimblase* or *vesicula blastodermica* and thereby inadvertently perpetuated the error that these cells were the precursor of the chorion. Bischoff believed the syncytiotrophoblast (or layer of placental tissue directly in contact with the maternal blood) was a product of the uterine mucosa, although he himself showed that it came away with the ovum when the latter is detached from its nidation point in the mucosa. An answer came when Barry[9] showed (1839) that the *corona radiata* is lost in the tube, and that the chorion may be seen developing in the morula stage. In the same year Volkmann[9] identified the chorion with the blastocyst. Van Beneden[17] separated the concepts of embryonic ectoderm and trophoblast (*couche enveloppant*), and Hubrecht[17] extended it with his term "chorionic ecotoderm." This did not, however, solve the problem of the syncytiotrophoblast, since Langhans himself, who had described the cytotrophoblast (or embryonic side of the placental barrier), still believed that the syncytiotrophoblast was a derivative of the maternal tissue![28,29]

A problem which taxed workers was the role of the allantois. It was shown above that N. Hoboken first identified the allantois in man, but was noncommittal in its interpretation. The definitive description and final interpretation is due Coste[9] and Dzondi,[42] who described its development and ultimate fate in the human embryo. Meckel the Younger is also said to have identified the *membrana media Hobokenii* as the allantois, although the evidence is incomplete.[9] Hand in hand with this problem went the genesis of the vessels of the placental villi. Von Baer and Valentin believed that they developed from the "endochorion" (cytotrophoblast). Modern views are more sophisticated, but it is remarkable that the school of Hertig and Rock has summoned much evidence for this conclusion.[6,19]

Progress concerning umbilical structures was rapid, and biochemical progress was made following Jacobson's[42] description of the chemistry of the allantoic pouch in the chick embryo, demonstrating definitively its excretory and respiratory functions. From 1828 to 1830 von Baer,[8] J. Müller, and Meckel[42] were determining the connection of the yolk sac with the gut. Many did not agree,[9] but Thomson's embryo of 1839 confirmed all their conclusions.

Of interest are the persistent views of important authors that the amniotic fluid was the source of fetal nutrition. As late as 1883 Hyrtl had to pay backhanded respect to this theory by observing, "The low protein content makes it improbable that the amniotic

fluid can be used for nourishment as was formerly believed." This confusion was the result of Weydlich's (1797)[9,34] inconclusive experiment of maintaining a calf for 14 days on amniotic fluid. This notion persisted in spite of Opitz'[34] argument that a fetus with an atretic esophagus continues its development to term! Fabricius' Hippocratic theory that the amniotic fluid is the sweat of the fetus had long since given ground to the unfortunate theory of Spigelius that the placenta secreted pneuma into the amniotic fluid for fetal development. Variations of this theory were perpetuated even until the time of Kölliker, who founded his more rational, if erroneous, theory of the *decidua vera* or *basalis* as the source of amniotic fluid on the fact that often substances given the mother appear in the amniotic fluid, which fail to appear in the urinary excretions of the fetus.[28]

The solution lay in the consequences of the little-known author W. Watson's[34] long-forgotten paper in the eighteenth century on the influence of smallpox on the fetus. His information on the placental circulation was insufficient to afford interpretation of immunity acquired by the fetus on the survival of the mother. But later J. C. Meyer[42] was able to demonstrate the phenomenon of potassium cyanide transfer from the lung of the rabbit to the blood of its fetus, and Magendie[34] demonstrated essentially the same phenomenon with camphor.

Bischoff made many contributions to the understanding of the placental barrier, not the least of which was his observation that in the eggs of all oviparous animals, the yolk must first be converted to blood before further development takes place. Bischoff prophetically remarked in 1842:

> Allein diese Ursache wirkt durch dieselben Materien, welche wir auch in der unorganischen Natur wirksam sehen, und es ist zunächst unsere Aufgabe, den Gesetzen nachzuforschen, nach welchen die verschiedenen Form—und Mischungsveränderungen dieser Materien in dem organischen Körper erfolgen.

Bischoff and E. H. Weber cited formidable arguments for placental respiration: (i) Compression of the navel cord induces death by suffocation with typical puerpural hemorrhages on the serosal surfaces. (ii) The nonbreathing newborn continues to live as long as the cord continues to pulsate. (iii) Carus' observation that upon contact with the atmospheric temperature, the cord of the rabbit newborn stops pulsating and respiratory movements commence, but when placed in warm water, the breathing ceases and the cord recommences pulsation. (iv) Mayer cites the intra-

uterine respiratory movements of the fetus on cord pressure. (v) Herissant first observed that the blood of the umbilical veins is arterialized.

The presence of lymph transport and nerves in the umbilical cord is still a somewhat disputed question, since the phenomenon upon which the contraction of the umbilical vessels depends has not been completely elucidated.[12] Closely related to this question of umbilical innervation was that of the method of propulsion of the maternal blood among the villous sinuses of the placenta. Ramsey's[37] recent paper contains an excellent review of the whole problem. Ramsey reinstates the *vis a tergo* theory published by Hinselman[37] in 1925. This took advantage of the then incomplete data on the maternal placental vascular anatomy and physiology. The arteriolo-villous-sinus-venule pressure differentials with their unique anatomy are held to be perfectly capable of maintaining placental circulation.

Charles Sedgwick Minot (1852-1914) and Otto Grosser (1873-1951)

The foregoing discussion of the analytic, descriptive work which preceded Charles Sedgwick Minot's "A Theory of the Structure of the Placenta"[33] is important to an understanding of the diversity of opinions and observations reconciled by this modest, but very important document. It appeared in 1891. Its essential features were as follows.

The placentae of the unguiculates (animals with claws or nails, including man) and the ungulates (hoofed animals) may be called chorionic and allantoic respectively. Evolution began with the former, in that the *area placentalis* fitted exactly to the surface of the maternal epithelium. This chorionic placentation then causes degeneration of the maternal tissues, especially the maternal epithelium and the glands, and a hypertrophy of the stroma, i.e., decidua of gravidity, an invariable factor in the formation of the placenta, although its exact degree varies from species to species, resulting in various intimacies of contact between the maternal and fetal circulations. "From this discoidal chorionic placenta, the zonary placenta of the carnivora, the diffuse placenta of lower primates and the metadiscoidal placenta of man have been evolved." But only in the unguiculates is the chorion sufficiently vascularized early in development to afford the chorionic placentation typical of the group. The ungulates do not possess a chorionic vascularization

sufficient to develop a placenta, and therefore the vessels of the allantoic vesicle aid in its formation. As a result the ungulate maternal blood is always contained in the maternal vessels and the chorion is always separated by maternal epithelium and stroma from these vessels. Or this type perhaps evolved into a chorionic type in ungulates with a vascular allantoic vesicle, which now possess a vascular chorion, explaining the absence of degeneration in the maternal tissues. The placenta is the organ of the chorion.

Otto Grosser's[17] works on placentation (1909 and 1927) are still standard morphology references. He rendered an invaluable service by his classifications and definition of placentation:

> A placenta in the narrower sense presumes the existence of a fetal chorion which lies directly on the maternal mucosa, and can thereby appear only in amniotes. . . . Placentation is the intimate connection (apposition or interaccretion), which is vascularized by either the allantois or the yolk sac, for the mediation of embryonic respiration and nutrition and for the elimination of its catabolic products. (1901)

VI. SUMMARY

Theories of structure and function of the placenta from prescientific to modern times are discussed. Additional data on the extra-embryonic membranes are included to coordinate the ideas which have influenced the evolution of concepts of the placenta.

Six currents of thought emerge in the following chronology:

(1) The animistic concepts of primitive man and the ancient Egyptians
(2) The Hippocratic theories of fetal nutrition
(3) The Aristotelian theories
(4) The Arantian theory of *hepar uterinum*
(5) The *Mayowian* theory of *pulmo uterinus*
(6) The modern theories dating from the time of Bischoff and Minot.

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Notes and Events

Edited by Dorothy M. Schullian*

John Howard: A Bibliographical Note

A recent examination of the holdings by the Wellcome Historical Medical Library of the books of John Howard has revealed several facts which supplement the details given in Baumgartner's bibliography (*Bull. Hist. Med.*, 1939, *7*, 486-534, 595-626) and provide matter for comment on the more recent note by Duveen and Klickstein (*J. Hist. Med.*, 1955, *10*, 114-116). The most interesting of these points concerns the first edition (1788) of the French translation of Howard's *State of Prisons*. The copy in the Wellcome Library, which is in a contemporary binding and has the bookplate of the Bibliotheca Lindesiana, has a title-page (Fig. 1) with a different setting of type from the one described by Baumgartner (No. 7) and also contains a preface by the translator which appears to be hitherto unknown, as well as an *Approbation* and a *Permission du Roi*.

The preface is contained in a separate gathering signed "a" and paged [i-] viii, which is bound immediately before sheet "A." The *Approbation* and *Permission du Roi* are found on two leaves which are not part of sheet "Ff" at the end of the second volume, and the former of these is signed "De Kéralio" and dated 1 January 1788; the latter is dated 23 July, and the accompanying registration 25 July of the same year.

This additional information does not enable us to identify the translator with certainty, but the person responsible for the *Approbation* must have been the Chevalier Louis-Félix Guinement de Kéralio who was a professor at the École Militaire, a member of the Académie des Inscriptions et Belles Lettres, and one of the editors of the *Journal des Savants*. The fact that he was also the father of the Louise de Kéralio to whom the translation has been attributed may account for the unusual warmth with which he recommends the work. When Howard was in the south of France at the beginning of 1786, he had been refused permission to visit the prisons or hospitals, and so hostile was the government that he thought it wise to conceal his purpose and to travel through France incognito as an English physician. No greater contrast could be found than the change of attitude reflected in this official *Approbation* dated less than two years later, which is worth quoting in full:

J'ai lu, par ordre de Monseigneur le Garde des Sceaux, un manuscrit intitulé: *Etat des Prisons, des Hôpitaux et des Maisons de Force, par M.C.* [*sic*] *HOWARD, traduit de l'Anglois.* Cet Ouvrage est un monument de l'humanité courageuse avec laquelle l'Auteur, celèbre à juste titre, a parcouru

* Cleveland, Ohio.

ETAT DES PRISONS, DES HÔPITAUX ET DES MAISONS DE FORCE;

PAR JOHN HOWARD.

TRADUIT DE LANGLOIS.

Ah little think the gay.....
Whom pleaſure, power and affluence ſurround
How many pine in want, and dungeon-glooms
Shut from the common air. (THOMSON.)

Ah ! combien peu les hommes légers qui vivent dans les plaisirs, environnés du pouvoir & de l'abondance, pensent à ceux qui languissent dans le beſoin, dans l'obscurité des prisons, privés de l'air commun à tous !

TOME PREMIER.

A PARIS,
Chez LAGRANGE, Libraire, rue S. Honoré, vis-à-vis le Palais Royal.

1788.

FIG. 1.

toute l'Europe, & en a visité tous les Hôpitaux & toutes les Prisons; on ne pouvoit attendre de sa bienfaisance universelle que la plus exacte impartialité; en publiant les défauts et les vices de ces établissemens; en disant ce qu'ils ont de bon et de sage, il a fait voir ce que les Gouvernemens attentifs et humains doivent y éviter & y tréformer; il enseigne comment ils peuvent et doivent les instituer. On ne peut lire un pareil ouvrage

qu'avec un vif intérêt et un profond sentiment de vénération pour son Auteur; il m'a paru digne d'être traduit et publié en françois et dans toutes les langues. A Paris, ce premier janvier 1788.
DE KÉRALIO.

Unfortunately, there is nothing in the preface to support the suggestion made by Duveen and Klickstein that the translation "probably resulted from the new interest aroused by the *Académie* reports" [on hospitals by Lavoisier and his colleagues]. We are, however, informed that the translation is based on the 1784 English edition, and there is a statement which helps to decide the order of the two issues.

Si j'avois à dédier cet ouvrage [writes the translator (pp. v-vi)], j'aurois osé l'offrir à l'homme grand et respectable dont la France s'honore, quoiqu'il ne soit pas né dans son sein, et qu'elle a vu avec regret laisser échapper de ses mains les rênes de la partie de l'administration la plus intéressante pour la nation; parce que c'est lui qui a pressenti le résultat des recherches de M. Howard; parce que sa sagesse vigilante a donné l'exemple des réformes à faire, pour assurer dans cette partie un ordre constant, qui conciliât ce qu'exige la sûreté de la société, avec ce que l'humanité demande. Mais que seroit mon hommage au milieu de ceux de la nation? Il y auroit de la vanité à croire l'en faire distinguer, et j'ai cru devoir me taire.

This great man who was honoured throughout France but who was not French born, who had been charged with one of the most important offices of government (the Ministry of Finance) but whom the translator dared not avow publicly, can only have been Jacques Necker, the Swiss-born ex-Minister of Finance who was the idol of the French liberals but who was, at the time when the translation was being made and the preface written, under sentence of banishment from Paris because of the hostility of the King. As the pre-revolutionary situation developed, the liberals were encouraged by the appointment of Necker as Director-General of Finances on 25 August 1788. After that date the tone of the preface was no longer relevant to the times, and it seems reasonable to suggest that it was removed. This would imply that the copy under discussion belongs to the original issue and the copy described by Baumgartner to a later issue.

Of the other points noted in the inspection of the Wellcome copies of Howard's works, the following may be worth reporting. The Wellcome Library has recently acquired a copy of the first issue of the *Appendix* to *Lazarettos,* 1791, of which Baumgartner (No. 28) mentions one copy only, that owned by Professor Fulton.* This copy also is bound up with the first edition of the *Lazarettos,* 1789 (No. 21), and is a presentation copy with autograph dedication, dated 7 March 1789, to John Disney, Unitarian minister and magistrate. The advertisement leaf is inserted, as in Fulton's copy, between A1 and A2, with the stub of the cancelled $\chi 2$ showing. In the Wellcome copy this *Appendix* follows what seems to be a rare item (only two copies in the Bodleian recorded, Baumgartner No. 58, note), the

* Editor's Note: A copy was acquired by the National Library of Medicine in 1958.

"Notes of a conversation held with Mr. Howard in May 1789," which is identical with an interview published in the *European Magazine*, 1790, *17*, 163-165. Above the title, in John Disney's hand, is the date "June 4, 1790."

Baumgartner (No. 21) takes the inscription in Osler's copy, dated 20 May 1789, as a convenient terminal date for the appearance of the *Lazarettos*. The publication of this work may be dated with certainty to February, 1789. Howard himself, in the *Appendix* to the *Lazarettos* noted above (sig. A-2), refers to "the account of the principal Lazarettos in Europe, which I published the beginning of the year 1789," and in John Field's *Correspondence of John Howard*, London, 1855, p. 157, there is a letter written by Howard to Samuel Whitbread, dated 7 February 1789, in which he states: "I this day finish at the press. I stay for several of my books to be put into boards, and see my plates properly placed in them." Field adds that "Howard's invaluable work was published in February, 1789." Further collateral evidence for a date early in 1789 is provided by the Wellcome copy of the *Lazarettos* which has an autograph dedication as follows: "Mr. Howard presents his compliments to Dr. Disney, and requests his acceptance of this book, as a small testimony of his esteem," and above, in Disney's hand, "Mar: 7 1789, J. D." Disney had the fortunate habit of recording the date of acquisition in his books.

RICHARD J. DURLING

Charles Darwin's Favorite Photographic Likeness

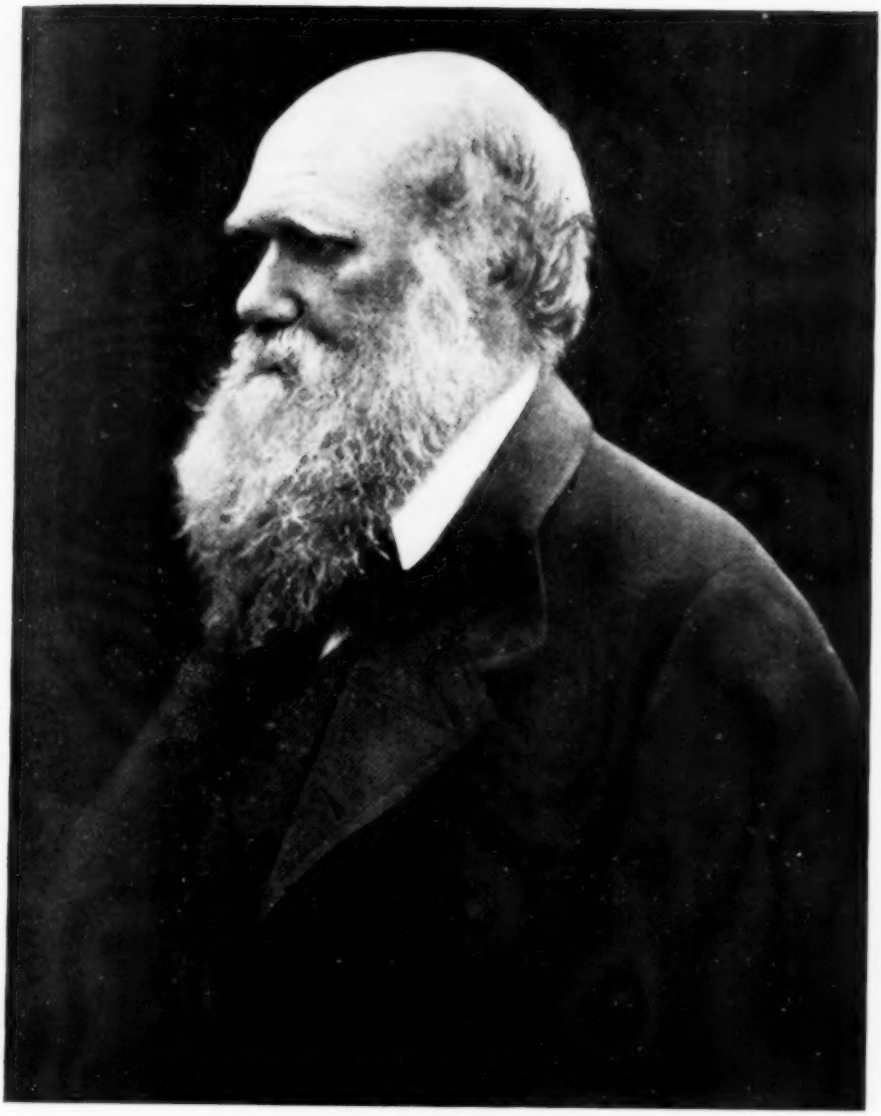
On the centenary of *The Origin of Species* it is incumbent upon his admirers to look again at Charles Darwin. Reprinting a little-known photograph of the great naturalist is satisfying to those interested both in medical history and in photography. Darwin's son, Francis, has written as follows of this photographic portrait of his father:

> The work on Man was interrupted by illness in the early summer of 1868, and he [Charles Darwin] left home . . . for Freshwater, in the Isle of Wight, where he remained with his family. . . . Here he made the acquaintance of Mrs. Cameron. She received the whole family with open-hearted kindness and hospitality; and my father always retained a warm feeling of friendship for her. She made an excellent photograph of him, which was published with the inscription written by him: "I like this photograph very much better than any other which has been taken of me."[1]

Two days after the family had returned from their holiday, Charles Darwin wrote to Sir Joseph Hooker, the botanist, whom Mrs. Cameron had also photographed.

> How about photographs? Can you spare time for a line to our dear Mrs. Cameron? She came to see us off, and loaded us with presents of photographs, and Erasmus called after her, "Mrs. Cameron, there are six people in this house all in love with you."[2]

The photographer, Julia Margaret Cameron (1815-1879), was an amateur and a pioneer of portrait photography.[3] When her wealthy husband



CHARLES DARWIN

Photograph by Julia Margaret Cameron. (Courtesy of Library of Congress)

left for India in 1863 to continue his work with the Indian Law Commission, she found herself very lonely. Her married daughter presented a camera to her with the words, "It may amuse you, mother, to try to photograph during your solitude." She was then 48 years of age. Promptly she turned the coal-house of her estate into a dark-room and her glazed fowl-house into a studio. Her position in British society gave her as sitters those whom fame had underlined — Joachim, Carlyle, Longfellow, Tennyson, Ellen Terry, Palgrave, Trollope, and Sir John Herschel, among others. At Tennyson's request, she illustrated his *Idylls of the King* (taking 245 photographs to obtain the 12 pictures). What she lacked in technique, she was able to make up with portraiture's Midas touch—the fame of the subject. Her clumsiness of focus led to her being accused of introducing the "soft-focus" school. Although critics of her day considered her a slovenly amateur, the recently published *Masters of Photography*[4] contains her work; modern estimates of her talent are more generous.

EDWARD SHAPIRO

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Appointment of Dr. Gernot B. Rath at the University of Wisconsin

Dr. Gernot B. Rath of the Institute of the History of Medicine at the University of Bonn has been appointed Chairman of the Department of the History of Medicine at the University of Wisconsin. He will assume his duties there on 1 January 1960.

Dr. Rath was Visiting Professor at Wisconsin for the second semester of 1958-59. American historians were happy to meet him and his wife in Cleveland during the meetings of the American Association for the History of Medicine 21-23 May. The work of the Institute from which he comes was described by H. Schipperges in the *Journal*, 1958, *13*, 401-411, which now extends its best wishes upon his new responsibilities.

Appointment of Derek John de Solla Price as Visiting Professor of the History of Science at Yale University

Yale University has announced the appointment of Dr. Derek John de Solla Price, Ph.D. of the Universities of London (1946, Physics) and Cambridge (1954, History) as Visiting Professor of the History of Science for the academic year 1959-60. In his statement concerning the appointment Professor George W. Pierson, Chairman of the Department of History, stated that Dr. Price would be a member of the Faculty of the Graduate School and that he would give general lectures on the history of science to undergraduates in Yale College and supervise advanced students in his-

tory in the Graduate School; Dr. Price will also be free to give special seminars and conduct research in other University Departments including that of the History of Medicine in the Historical Library of the Medical School. During the past year Dr. Price has been a John W. Donaldson Fellow and for two years a Member of the School of Historical Studies at the Institute for Advanced Study, Princeton, New Jersey.

Passano Award for 1959

A note in *Science*, 1959, *129*, 951 carried the welcome announcement that the $5,000 Passano Award for 1959 has been conferred upon Dr. Stanhope Bayne-Jones, whose many services to medical research in the fields of bacteriology and preventive medicine have gone hand in hand with his substantial contribution to medical education during many years of teaching and administration. Dr. Bayne-Jones has served the cause of medicine also in two world wars and as Chairman of the Secretary's Committee of Consultants on Medical Research and Education, Department of Health, Education, and Welfare.

The award was presented at a reception and dinner on 11 June during the meetings of the American Medical Association in Atlantic City. A committee formed by Dr. John R. Paul has commissioned from Deane Keller a portrait of Dr. Bayne-Jones which will be hung in the Yale School of Medicine.

Films Available of Manuscripts in Osler Library

The manuscripts in the Osler Library of McGill University have been photofilmed through the generosity of an anonymous benefactor and the positive films are now available for inter-library loan. These include all items listed under "Manuscripts" in the index of the *Bibliotheca Osleriana*, 1929, except those of Osler's own writings, published, unpublished (his taboo), and (one) unpublishable.

Grantly Dick Read, 1890-1959

Grantly Dick Read, M.A., M.D. (Camb.), M.R.C.S., L.R.C.P., the British obstetrician who died on 11 June 1959 at the age of 69, will be remembered as a man who made a lifetime pursuit of an idea which is becoming fundamental in modern obstetrics, namely, that with preliminary training and skillful attendance most women can go through the childbirth experience with a minimum of discomfort and with a heightened sense of satisfaction. Read's chief argument found its basis in the concept that childbirth is a physiological function and normally should be painless. He contended that pain was caused by muscular tension which in turn was caused by fear. To reduce fear he advocated instructing the mother in the physiology of birth, and to reduce muscular tension he recommended the 'progressive relaxation' techniques of Edmund Jacobson of Chicago. Dr.

Read's theories became well known in the United States after the appearance of his book *Childbirth without Fear, The Principles and Practice of Natural Childbirth* in 1944. In 1947 he lectured in this country, and as a result of this visit and one by a co-worker, Mrs. Helen Heardman, the Department of Obstetrics and Gynecology at the Yale University School of Medicine, with the support of the Maternity Center Association of New York, embarked upon a study of Read's methods and their application to hospital practice—the first approach to the subject in a teaching hospital. The result of this is seen in the Preparation for Childbirth Program at the Yale Medical Center in New Haven, now in its thirteenth year. While the Yale Program does not follow many of Read's recommendations it has proven to most observers that for many women intelligent preparation for childbirth yields gratifying results. In many teaching clinics this broadened concept of Read's thinking is now considered 'good obstetrics.'

For the record it should be said that Read never insisted upon complete omission of anesthetics or analgesics in childbirth. In his own words, "Pain is the only justification; it does not matter whether the pain is secondary to fear or whether it is primarily physical." In his own country Read became a controversial figure chiefly because of his disbelief in the existing order of obstetrical procedure and his outspoken expression against those who did not share his views. In letters to friends in this country he always expressed deep disappointment over the slow recognition accorded to what he considered was obstetrical progress. However, in later years he had satisfaction in seeing that much of his basic thinking about the psychology of childbirth was gaining wide acceptance. From present evidence in American obstetric texts and clinics, it is likely that his name will be regarded as one of historical significance for many years to come.

HERBERT THOMS

The Dr. Hugh H. Smith Gift, University of Arizona Library

Dr. Hugh H. Smith, well known as virologist, bacteriologist, and co-developer of the yellow fever vaccine, is now retired from the Rockefeller Foundation and is serving as professor of bacteriology at the University of Arizona. He has presented to that university his collection of hundreds of titles which illustrate the history of medicine from the time of Hippocrates to the modern era and which include not only the writings of some of the greatest names in medicine but also biographies, historical works, and numerous publications on public health, tropical diseases, and hospitals.

Dr. Smith's interest in the history of medicine was kindled at Johns Hopkins, where he received his M.D. degree in 1927, and his collection was assembled primarily in the decade 1924-1934. The press release from the University of Arizona justifiably expresses the hope that in turn "the

imagination of generations of science students and perhaps of some of the great doctors of the future will catch fire" from his gift.

In twenty-one mimeographed pages (September, 1958) Phyllis Ball, Special Collections Librarian at the University, describes simply and attractively some seventy of the items. Not in the main dazzling showpieces, not costly first editions, they present instead solid and standard texts of outstanding physicians which in many cases had not previously been available in Tucson. Hippocrates and Celsus, Cornaro and Fracastoro, Santorio, Willis, Sydenham, Mauriceau, and Pitcairne would help any student to understand the state of medicine in their respective periods. For the eighteenth and nineteenth centuries there is division by countries; authors like the Monros and Lind are offered for Scotland; Pott, John Hunter, Bright, and Addison for England; Morgagni for Italy; Bichat, Laennec, Bernard, and Pasteur for France; Haller, Skoda, and Krafft-Ebing respectively for Switzerland, Austria, and Germany; and Rush, Waterhouse, Drake, and Nathan Ryno Smith for the United States. As yet undescribed are items by Osler, Welch, and Cushing. It is in short a representative and admirable collection of medical science from which students at the University of Arizona can profit much. That prospective medical students in Arizona can also profit by it becomes a distinct and cheering possibility with the welcome news, released 10 June, that The Commonwealth Fund of New York has granted to the Board of Regents of the Universities and State College of Arizona $135,000 for a study of the need for a medical school in Arizona.

Research Grants in the History of Medicine Awarded by the National Institutes of Health, 1958-1959

A paper presented by Philip Sapir and Jeanne Brand before the American Association for the History of Medicine on 23 May 1958 and published in the *Bulletin of the History of Medicine,* 1959, *33,* 67-74 set forth the role of the National Institutes of Health in supporting research in the history of medicine. During the past year certain of the Institutes have awarded grants over varying periods for such research. The Institutes concerned, the recipients, and the subjects of research follow:

DIVISION OF GENERAL MEDICAL SCIENCES, to Saul Jarcho, "History of Medicine in the United States"; to Genevieve Miller, "A Bibliography of the Writings of Henry E. Sigerist"; to Francisco Guerra, "Pre-Columbian and Colonial Medicine in the United States"; and to Hebbel E. Hoff and Ariel Bar-Sela, a translation of Maimonides' *Regimen of health.*

NATIONAL CANCER INSTITUTE, to Esmond R. Long, "History of American Pathology."

NATIONAL INSTITUTE OF MENTAL HEALTH, to Eric Carlson, "Development of Psychiatric Thought in the United States"; to Gregory Zilboorg and George Mora, "The Foundation Stones of Present-Day Psychiatry"; to Gerald Gru-

man, who has since released the award to accept a NIHM post-doctoral research fellowship, "History of Prolongevity Hypotheses"; and to Iago Galdston, "History of Medical Education."

The National Institute of Mental Health has in addition awarded the following research fellowships: to Mrs. Patricia Spain Ward, "A Study of American Medical Thought and Practice as Illustrated by the Life of Dr. Simon Baruch, 1840-1921"; to Theodore Jurgen Spahn, "The Development of the London Voluntary Hospital during the Latter Half of the 19th Century"; to E. Alan Richardson, "The Clergymen-Physicians of 17th Century England and America: a Study in the Care and Healing of Souls"; to Charles E. Rosenberg, "A History of Cholera in the United States"; to Gerald Gruman, "A History of Prolongevity Hypotheses"; to Allen Debus, "The Evolution of Paracelsian Medicine and Chemistry in England"; to Richard Grant, "Communication of Medical Knowledge."

Further information on research grants in the history of medicine may be obtained from Dr. Jeanne Brand, Medical Research Program Specialist, National Institute of Mental Health, Bethesda, Maryland, and on research fellowships from Dr. Stephen P. Hatchett, Acting Chief, Research Fellowships Review Branch, Division of Research Grants, National Institutes of Health, Bethesda 14, Maryland.

International Conference on the History of Dentistry

An International Conference on the History of Dentistry will be held Thursday, 10 September 1959, at the Lexington Hotel, New York City. The conference is being presented under the joint sponsorship of the American Academy of the History of Dentistry and the Subcommittee on the History of Dentistry of the Fédération Dentaire Internationale. The conference will be one of the official programs preceding the Centennial Session of the American Dental Association, 14-18 September, and the 47th Annual Session of the Fédération Dentaire Internationale, 12-18 September, in New York City.

The program will feature topics of interest to dental historians. The following persons will present brief lectures: L. J. Cecconi, Paris; F. E. R. De Maar, The Hague; Curt Proskauer, New York City; Samuel Fastlicht, Mexico; George B. Denton, Chicago; Ivolino de Vasconcellos, Rio de Janeiro. There will be several formal presentations, including the gift of a rare historical volume to the American Dental Association by the Academy on behalf of Dr. Arthur H. Merritt of New York City.

Dr. Aníbal Ruiz Moreno and the History of Medicine in Buenos Aires

On 29 May 1959 the Department of the History of Medicine, Yale University School of Medicine, was visited by Professor Aníbal Ruiz Moreno, Chairman and Professor of the History of Medicine in the Facultad

de Ciencias Médicas, Buenos Aires, Argentina. The chair was instituted there in 1937 for the third time in the history of the school. The first occasion was in 1852, when the Chair of Legal Medicine, General Pathology, and the History of Medicine was founded; in 1875 the chair was re-established as the Chair of General Pathology and the History of Medicine but was abolished in 1880. Not until 1937 was the chair filled again, when Professor Juan Ramón Beltrán, who died in 1947, was appointed.

Dr. Ruiz Moreno became chief assistant to Professor Beltrán in 1938. In 1946 he was put in charge of the department and a year later was appointed Professor and Chairman. The full-time academic members of the department include one director of practical studies, two translators of Greek and Latin, one historical research worker, and one general research worker. The department has as well four people in charge of seminars and one research worker who are honorary appointees.

In 1945-1946, while Dr. Ruiz Moreno was lecturing on the history of medicine at the Facultad de Ciencias Médicas de La Plata, near Buenos Aires, he founded the Sociedad de Historia de la Medicina de La Plata and started the publication of a journal. His department at Buenos Aires has published eighteen volumes on the history of medicine, including translations from Galen, treatises on smallpox, and studies on the Protomedicato of Buenos Aires and the *Regimen sanitatis Salernitanum*. Dr. Ruiz Moreno has himself published several books and monographs and almost a hundred papers on the history of medicine.

The study of the history of medicine is not compulsory for most medical students in Buenos Aires. One lecture is delivered every week, and only those physicians who intend to specialize in psychiatry are required to attend the courses. The great majority of those who enroll are physicians who have already been graduated; some fifteen to twenty physicians register voluntarily every year. Many theses have been published, and the department has copied from national, provincial, municipal, and ecclesiastical archives almost ten thousand documents relating to the history of medicine.*

Historical Gleanings

Matcheld J. Mellink reports in the *American Journal of Archaeology*, 1959, *63*, 84 on recent excavations at Ephesus. They included a further clearance of some baths. Not far from these was found a statue of the early fifth century A.D., now headless, which may represent a physician Alexander.

Albert Essler, who is a doctor of both classical studies and medicine, has presented the extant evidence on the physical characteristics and medical histories of the first six Caesars in *Cäsar und die julisch-claudischen*

*Compiled by Francisco Guerra from notes furnished by Professor Ruiz Moreno at the request of the Editor.

Kaiser im biologisch-ärztlichen Blickfeld (Janus, Suppl. vol. I, Leyden, E. J. Brill, 1958). The volume is reviewed by Richard T. Bruère in *Classical Philology,* 1959, *54,* 141-142.

In *Cahiers d'histoire mondiale,* 1958, *4,* 330-347 Kiyoshi Yabuuchi reviews "The development of the sciences in China from the 4th to the end of the 12th century." Medical science and pharmacology are surveyed on pages 334-335, 339-341, and 345-346 respectively for the period of the Northern and Southern dynasties, the Sui-T'ang period from the end of the 6th to the beginning of the 9th century, and the Wu-Tai, Sung period from the beginning of the 9th to the end of the 13th century.

The Bibliothèque Nationale provided in 1958 an exhibit "Byzance et la France Médiévale," at which were displayed examples of illuminated manuscripts of Byzantine influence dating from the second to the sixteenth centuries and gathered from seventeen French libraries. The following manuscripts of medical interest were included from the holdings of the Bibliothèque Nationale itself: Dioscorides, *De materia medica,* s.IX (Gr. 2179); *Collection médicale,* s.X (Suppl. gr.1297); Nicander, *Theriaca,* s.X (Suppl. gr. 247); Nicolaus Myrepsus, *De compositione medicamentorum libri XXIV,* 1339 (Gr. 2243); Hippocrates, *Oeuvres diverses,* s.XIV (Gr. 2144); Hierocles, *De curandis equorum morbis libri II,* s.XIV (Gr. 2244); and *Collection des chirurgiens grecs,* s.XVI (Gr. 2247). An admirable catalogue, with preface by Julien Cain, a review of Byzantium's relations with mediaeval France by Jean Porcher and Marie-Louise Concasty, an historical account by Charles Astruc of acquisitions by the Bibliothèque Nationale in Greek manuscripts, 94 pages describing 161 items on exhibit, and 32 plates, accompanied the exhibit. Such exhibits are of untold value in revealing the treasures of the past. A similar, though more extensive, one was the "Mostra Storica Nazionale della Miniatura" which was held in Rome in 1954 and noticed in the *Journal* for that year, *9,* 115-116. Another was that which commemorated, in June-October 1958, the four hundredth anniversary of the foundation of the Bayerische Staatsbibliothek in Munich. This library, which suffered serious war damage, is once again fully operative, and it is hoped that the complete restoration of its building in the Ludwigstrasse can soon be accomplished. It has an enormous wealth of medical treasures in manuscripts, incunabula, and early printed books.

Austin Lane Poole has edited a new edition, revised and rewritten, of *Medieval England* (Oxford, Clarendon Press, 1958, 2 vols.). To this A. C. Crombie has contributed an additional chapter on Science (pp. 571-604, in vol. 2) which includes medicine and in which occur such familiar names as Bald, Gilbert the Englishman, John of Gaddesden, and John Arderne. The following articles may also be of interest to medical historians: "Learning and Education," by A. B. Emden, pp. 515-540; "Handwriting," by V. H.

Galbraith, pp. 541-558; "Printed Books, the Book-Trade, and Libraries," by Strickland Gibson, pp. 559-570.

In *Speculum*, 1959, *34*, 20-38 Lynn Thorndike contributes to the identification of John of Seville and discusses the translations which are ascribed to him.

Manuscripts may be displayed also outside the confines of libraries and at manifestations which are not purely palaeographical. The exhibit "Arte Lombarda dai Visconti agli Sforza," which was held at the Palazzo Reale in Milan April-June 1958, included the following manuscripts which are of interest to medical historians: *Tacuinum sanitatis* (Paris, Bibliothèque Nationale, Nouv. acq. lat. 1673); *Historia plantarum* (Rome, Biblioteca Casanatense, 459); Manfredus de Monte Imperiali, *De naturis auri argenti et herbarum* (Paris, Bibliothèque Nationale, lat. 6823); *Theatrum sanitatis* (Rome, Biblioteca Casanatense, 4182); *Tacuinum sanitatis* (Vienna, Nationalbibliothek, Series Nova, 2644); *Tacuinum sanitatis* (Rouen, Bibliothèque Municipale, Leber 1088); Avicenna, *Canon* (Bologna, Biblioteca Universitaria, 2197). Dating from the fourteenth and fifteenth centuries and assembled here from three nations, they offered a rare opportunity for comparison of their miniatures.

It is clear from the handwritten inventory at the Vatican Library that roughly half of the original contents is now missing from the fourteenth century codex Vaticanus latinus 3066. Charles J. Ermatinger shows in *Manuscripta*, 1958, *2*, 155-162 that the missing portion, which includes writings of Tommaso and Dino del Garbo, Antonio da Parma, Mondino de' Luzzi, Niccolò Bertruccio, Pietro Torrigiano de' Torrigiani, and Gentile da Foligno, was separated in the time of Pope Pius VI (1775-1779) and Cardinal Francesco Saverio Zelada (d. 1801) and became the present codex Vaticanus latinus 3144.

In *Manuscripta*, 1959, *3*, 3-18 Loren C. MacKinney discusses medical illustrations in mediaeval manuscripts of the Vatican Library, with particular reference to the Barberini, Borghese, Chigi, Palatine, Regina, Rossi, and Urbino collections. The discussion will be continued in a forthcoming issue, when presumably the Vaticani latini will be examined.

The last issue of the *Journal* carried a review by Derek J. de Solla Price of Volume 2 of George Sarton, *A History of Science*. The emphasis on astronomy was appropriate in view of Dr. Price's special interest in the history of that subject. Readers who missed it at the time of publication may wish to turn now to his edition, from Peterhouse MS. 75.I, of *The equatorie of the planetis* (Cambridge, at the University Press, 1955). This edition, which was reviewed by Francis R. Johnson in *Isis*, 1956, *47*, 197-198, provides transcription, facsimile, and translation, with notes and extended discussion, of a Middle English text describing an instrument for calculating the positions of the planets. The work was composed

*c.*1392, it has been ascribed to Chaucer, to whose *Treatise on the Astrolabe* it is a companion piece, and there is much support for the claim that the text and the first set of tables in the Peterhouse manuscript are a Chaucer holograph. On 7 April 1959 Dr. Price delivered before the Department of the History of Medicine at Yale University a lecture entitled "A Geared Astronomical Machine of the First Century B.C." This has been described at length in the *Scientific American* for June 1959 ("An Ancient Greek Computer," pp. 60-67). An account in preliminary form was also given by Dr. Price in a chapter in Charles Singer's *A History of Technology* (vol. III).

R. J. Mitchell and M. D. R. Leys, presenting in *A History of London Life* (London, Longmans, Green and Co., 1958) fifteen chapters on the city's history, take into account at several points its sanitary history. On pages 37-41 the importance of the scavengers in Chaucer's London is emphasized; these were responsible officials who controlled all arrangements for safety and cleanliness and so supervised the collection of slop, the condition of latrines and open sewers, and the cleaning of streets. The city's plagues are discussed on pages 101-106. Chaper XIII is entitled "Edwin Chadwick's London" and includes on pages 234-239 a summary of the problem of water supply and on pages 239-242 an explanation of the relation of drains to disease.

John and Isobel-Ann Butterfield contribute to *History Today*, 1958, *8*, 628-633 a medical diagnosis of the case of Joan of Arc. "All the evidence," they say, "points to there having been some organic abnormality in the region of the left temporo-sphenoidal lobe of Joan's brain which acted as a focus of irritation and gave her mixed sensations of visions and voices on her right." They advance the theory that bovine tuberculosis was the most probable cause of the lesion, since she grew up among herds whose descendants still graze beside the Meuse and would have had every chance of contracting from tubercular cattle a generalized mild infection before the particular tuberculoma in her brain revealed her visions to her. This theory would imply that the origin of her inspiration was in her own brain, that she was not the tool of anyone, and that she gave her life for the truth and independence of her own mind.

To the memorial volume entitled *Fritz Saxl, 1890-1948* and edited by D. J. Gordon (London, Thomas Nelson and Sons Ltd., 1957) Charles Singer contributed (pp. 261-269) an essay on the confluence of humanism, anatomy, and art. In this he dismisses any idea of anatomy as an independent science in the scholastic centuries, maintains that anatomy as we know it today could not have arisen from a scholastic academic approach, and suggests that four factors were responsible for the change—the new study of the human form and the study of perspective, chiefly in the fifteenth century, and the discovery and/or re-editing of Greek anatomical

texts, and the new skill in the art of the wood-cutter, chiefly in the sixteenth century.

The Times (London) of 14 February 1959 carried an article by W. S. C. Copeman, Master of the Apothecaries, on the medical art of old monarchs. It was written in anticipation of the reception of the Duke of Gloucester on 17 February into the "Freedom of the Art and Mystery of the Apothecary" by the Master and Wardens of the Guild in their ancient hall. Although Mithradates invented a famous antidote for all poisons, and Cleopatra's name is attached by tradition to a number of cosmetic recipes, and the Holy Roman Emperor Frederick II became so infatuated with herbalism and medical astrology that he abdicated in favor of his son and retired to his "apothecarie's" laboratory in his castle at Linz, Dr. Copeman points out that with King Henry VIII (1491-1547) in England we first meet personal virtuosity in the fields of medicine and pharmacy. Henry, it will be remembered, established the Royal College of Physicians in association with Thomas Linacre, incorporated by Royal Charter the Company of Barber-Surgeons, and also dabbled personally in physic. The article was answered by a letter published 17 February from John Read, of the Department of Chemistry, University of St. Andrews, who would assign the monarchal primacy to James IV (1473-1513) of Scotland. The interests of James embraced medicine, surgery, dentistry, physiology, and even psychology.

On 13 November 1957 in the Lecture Hall of Marischal College G. A. G. Mitchell, Professor of Anatomy in Manchester University and Dean of Manchester Medical School, delivered the P. J. Anderson Memorial Lecture on the subject "The Medical History of Aberdeen and Its Universities." Professor Mitchell was graduated at Aberdeen in 1929 and until 1939 lectured on anatomy and surgery there. His Anderson Lecture has been published in *The Aberdeen University Review*, 1958, *37*, 225-238. It discusses such events, institutions, and individuals as monastic hospitals in Aberdeen prior to the Reformation; the recognition of medicine at the College of St. Mary, now known as King's College, in the Papal Bull of Erection of 1494, which was the first academic recognition of medicine in Britain; the regulation, the earliest of its kind, which was passed by the Aberdeen councillors on 21 April 1497 and by stating explicitly that "all licht wemen be chargit and ordanit to decist fra their vicis and syne of venerie" showed an early realization of the manner in which syphilis usually spread; Mediciners like Dr. Gilbert Skeyne, who in 1568 published the first medical book printed in Scotland, *Ane Breve Descriptioun of the Pest;* the famous "Academic Gregories," all descendants of a sixteenth-century Aberdeen saddler, who during a period of almost two hundred years supplied at least fourteen professors, mainly in medicine, mathematics, and philosophy, to British universities; Aberdeen leper hospital, whose last recorded patient was admitted in 1604; William Gordon, M.D.

of Padua, who in 1636 successfully petitioned the Privy Council for permission to obtain human bodies for study, since he had exercised his students sufficiently for two years past in the dissection of animals; the municipal enactment of 1647, the first of its kind in Scotland, which apparently without knowledge of the real reason justifying such a precaution and certainly without success ordered that poison should be laid for rats and mice when the plague was reported in Bervie and Brechin; and Sir James McGrigor, "father of the Army Medical Corps."

The exhibition "Dutch Drawings: Masterpieces of Five Centuries," which was organized by the Rijksmuseum, Amsterdam, and circulated by the Smithsonian Institution in 1958-1959 in Washington, New York, Minneapolis, Boston, Cleveland, and Chicago, included the striking portrait of Charles de l'Écluse, in black and red chalk, which was executed by Antonis Mor probably about 1565. Its permanent home is the Museum Boymans in Rotterdam.

Mario Fanti traces in *Strenna storica bolognese (Anno ottavo)*, Bologna, 1958, pp. 17-43, the history of the villa outside Bologna, in the parish of S. Antonio di Savena, in which Ulisse Aldrovandi did so much of his scientific work. The last remains of this country refuge were destroyed in 1857-1860 with the opening of the Bologna-Ancona railroad. Fortunately there is ample manuscript evidence in the Biblioteca Universitaria of Bologna for the paintings and inscriptions which adorned the villa. In addition, many of Aldrovandi's manuscripts are dated from there, and we have for the year 1604 lists of books transported to and from the villa. This is very possibly the year in which he paid his last visit there, for he died on 4 May 1605 after several months of illness.

The *Revue du Nord*, 1957, *39*, 227-234 contains an article by L. Elaut entitled 'Raphael Thorius de Bailleul; Médecin, Humaniste et Poète." Thorius was the author of a Latin poem in praise of tobacco which was published at Leyden in 1625 (Arents 157) but which had circulated earlier in manuscript in England during the time when the plant was being castigated by James I.

William A. Jackson in *The Houghton Library Report of Accessions for the Year 1957-58* (Cambridge, Massachusetts, Harvard College Library, 1958) records several accessions which will be of interest to historians of medicine. The deposit there of the Loeb copy of the first edition of Harvey's *De motu cordis* has already been noted in these pages (1958, *13*, 525) by W. B. McDaniel, 2d. The Houghton Library has received by gift the rare first edition, in the Duke of Asolla-Colbert-Duc de Broncas-Count MacCarthy-Thorold copy, of Matthaeus Silvaticus, *Liber cibalis et medicinalis pandectarum*, Naples, 1 April 1474, and four autograph letters of Francesco Redi. It has also received, from the estate, thousands of letters in the literary and scientific correspondence of the late George Sarton;

letters of Albert Einstein, Albert Schweitzer, William Osler, Harvey Cushing, Julian Huxley, and Alexis Carrel are included.

The measures taken in Bologna to combat the epidemic of pest which for Milan is so powerfully described in Alessandro Manzoni's *I promessi sposi* are discussed by Guido Guerrini in his article "La Pestilenza del '630," *Strenna della Famèja bulgnèisa, 1959* (Bologna, Scuola grafica salesiana, 1958), pp. 174-180.

In *Notes and Records of The Royal Society of London,* 1958, *13,* 115-127 Richard A. Hunter and Ida Macalpine have performed the useful service of collecting and reprinting the passages in which Robert Boyle refers to William Harvey. "Harvey's name occurs 25 times in Boyle's writings in 22 separate passages; in addition there are 3 other passages which in the light of those in which Harvey is named may also be accepted as referring to him. Taken together the picture emerges of a closer contact between Harvey and Boyle than appears to have been realized."

The work of Patrick Romanell on the connections between Locke the philosopher and Locke the physician has been officially reported in the *Year book of the American Philosophical Society,* 1958, pages 347-349. Dr. Romanell's investigations had been supported by a grant from the Society. The report carries a classification of Locke's medical papers.

Volume VI of *Studies in the Renaissance* (New York, The Renaissance Society of America, 1959) contains, in articles on nonmedical subjects, the following passages of medical interest: on pages 16-22, a discussion by Karl H. Dannenfeldt of the use of *mummia* as a curative drug and of its importation into Europe during the Renaissance; on pages 54-55, remarks by Gretchen L. Finney on the value of musical number in medical practice, especially in measuring the pulse; on page 90, a paragraph in which Donald C. Baker lists the British monarchs, from Charles II to Queen Anne, who on the model of the thin gold coin called the angel caused special little amulets or token angels to be struck for distribution in ceremonies of touching for the king's evil. Among the last of sufferers from scrofula to be "touched" and to receive such a medal was Samuel Johnson.

The "familiar doctrine" that Samuel Johnson liked to play rashly the role of physician to himself is supported by F. L. Lucas in a letter to the editor of *The Times Literary Supplement* which was published in the issue of 20 March 1959.

Honors for the 250th anniversary in 1957 of the birth of Carl von Linné included, near the end of that year, an exhibition at the University of Kansas Libraries. Linné holdings and related materials were arranged to commemorate both his birth and the 200th anniversary of the issue of his *Systema naturae,* 10th edition, in 1758. The catalogue of the exhibition (Lawrence, 1957, 48 pp.) was prepared by Thomas R. Buckman and describes seventy-three items.

Leonard Jolley in *The Bibliotheck,* Autumn, 1956, *1,* No. 1, 28-29 initiated some inquiries concerning the confused bibliography of William Cullen's *First lines of the practice of physic,* for the various volumes of which the process of expansion and revision went on side by side to the despair of both contemporary and more recent bibliographers. J. Murray remonstrated during the process, and his complaints, unanswered by Cullen, were published in 1784 under the title *An author's conduct to the public, stated in the behaviour of Dr. William Cullen, His Majesty's physician at Edinburgh.* The letters contained therein give interesting information on the economics of the book trade in the eighteenth century.

Denis I. Duveen continues to make important contributions to our knowledge of the life and work of Antoine Laurent Lavoisier. In *Notes and Records of The Royal Society of London,* 1958, *13,* 59-60 he publishes a letter written by Lavoisier from prison to Antoine François Fourcroy on 19 Frimaire, l'an II (9 December 1793), which displays a naïve unawareness of the danger impending. And in a series of four articles entitled "Antoine Laurent Lavoisier and the French Revolution" and printed in the *Journal of Chemical Education* (1954, *31,* 60-65; 1957, *34,* 502-503; 1958, *35,* 233-234 and 470-471) he examines certain details of the last few years of Lavoisier's life, introducing new evidence and investigating in particular some of the attacks upon him.

Dr. Joseph I. Waring, 82 Rutledge Avenue, Charleston 37, South Carolina, has distributed to interested friends his selection of *Excerpts from the Minute Book of the Medical Society of South Carolina from 1789 to 1820* [1957]. This brochure of 59 pages and 2 plates gives a vivid picture of the official deliberations of the Society during a significant period in American medicine. It reveals likewise the effort made to provide a helpful library for the members, some of whom, like many borrowers today, took little heed of expiration dates. On 1 February 1796, e.g., the Committee on the Library, giving a report, was "sorry to add that Dr. Moultrie appeared to be a delinquent, having kept Russels' Aleppo 20 days longer than the time prescribed by the rule."

There has been some dispute between medical and economic historians concerning the causes of English population growth during the Industrial Revolution. The former have argued that for this period medical advances, with the exception of vaccination, were demographically irrelevant, and that the growth was due to environmental changes, mainly economic. At least one economic historian gave the responsibility to medical factors. But there had been no recent detailed examination of the statistics until J. T. Krause, in his article "Changes in English Fertility and Mortality, 1781-1850" (*Economic History Review,* 1958, *11,* 52-70) studied the English national statistics. These seem to him to suggest strongly that the major cause of the growth was a rising birth rate. He recommends, however, a study of the statistics also at the local level.

A famous brand of deviled ham owes its origin, according to the *New York Times* of 9 December 1958, to efforts to protect sailors from scurvy and beri-beri. When William Lyman Underwood established himself in 1821 as a ship chandler on the Boston waterfront, he found himself forced to take large amounts of spices in trade for foods which would keep fresh during many months at sea. These very spices, he discovered, could preserve foods in glass containers. Mr. Underwood later developed, with Samuel Cote of the Massachusetts Institute of Technology, the scientific basis for preserving foods in tin containers, and although Webster's Dictionary prefers a derivation from AS. *canne,* tradition has it that his bookkeepers, weary of writing repeatedly the word "canister" (from L. *canistrum,* a reed basket), proceeded to shorten it to "can."

On 8 June 1896 Guido Farina made medical history in Rome by suturing the right ventricle of a patient who had received a sword wound in the heart. He had lived quietly since his retirement in a rustic house in the Alban Hills, whence he was called on 15 March 1959 to the town hall of Albano to receive honorary citizenship in Albano and a gold medal from the Medical Council (Ordine dei Medici) of Rome. The medal is the second to be awarded; the first had been conferred on 21 October 1958 upon the renowned brothers Bastianelli—the surgeon Raffaele and the physician Giuseppe. It is a sad task to record here that Dr. Farina died on 20 April 1959, at the age of 91, and Dr. Giuseppe Bastianelli on 30 March 1959, at the age of 96.

The Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. has for sale at the price of 45 cents a report entitled *International Medical Research.* It is a compilation of background materials which was prepared for the Committee on Government Operations, United States Senate, John L. McClellan, Chairman, and its Subcommittee on Reorganization and International Organizations, Hubert H. Humphrey, Chairman, pursuant to S. Res. 347, 85th Congress, 10 November 1958. One might not expect to find medical history here, but in the section on the significance of foreign contributions to present knowledge in major areas of medical research each area—general medical science, cardiovascular medicine, microbiology, arthritis and metabolic diseases, neurology, mental health and mental illness, dentistry, biologics control, and cancer—is introduced by an historical review in which the great names and landmarks appear in chronological order, and there is in addition a brief history of American medical research.

The *Library Journal,* 1958, *83,* 3362-3363 carried an account by Mrs. Sarah C. Brown, Librarian, University of Alabama Medical Center, of the new Lawrence Reynolds Library there. This library "was designed and built to house the gift of 4,000 rare medical books, manuscripts and other material presented to the University by alumnus Dr. Lawrence Reynolds of Detroit, Michigan." The same issue provides on p. 3400 an artist's con-

ception of the projected Hunt Library at the Carnegie Institute of Technology (*Journal*, 1959, *14*, 100).

The paper delivered by George Rosen before the American Public Health Association in St. Louis on 29 October 1958 has appeared in *Public Health Reports*, 1959, *74*, 199-209. It is entitled "Provision of Medical Care: History, Sociology, Innovation" and will be of particular interest to historians concerned with the background of group medical practice. Fifty references dating from 1835 to 1958 are provided.

Fifteen essays were submitted by readers of *Medical History* in the prize essay competition which closed 31 December 1958. The judges (Dr. William Brockbank, Sir Zachary Cope, and Dr. F. N. L. Poynter) awarded the £25 prize unanimously to Dr. W. D. Foster of the Louis Jenner Laboratory, St. Thomas's Hospital, London, for his essay entitled "The Early History of Clinical Pathology in Great Britain." The essay will be published in the July 1959 issue of *Medical History*.

In connection with the note in the *Journal*, 1959, *14*, 97 on the obligatory course in the history of medicine which will be given at Guy's Hospital Medical School by Dr. Edmund J. Moynahan, it is a pleasure to report that such a course has been provided at the University of Durham since April, 1955, where Dr. Meredith H. Armstrong Davison has, each year, delivered obligatory lectures on this subject to medical students in their third year, i.e., at the beginning of their clinical training.

Lines on thermodynamics and evolution, done in the cadenced prose of Chauncey D. Leake, appeared in the *New York Times* of 19 March 1959. The *Journal* extends its congratulations and good wishes to Dr. Leake on his new office as President-Elect of the American Association for the Advancement of Science.

A preliminary list of about two hundred items in the David A. Tucker, Jr. Library of the History of Medicine was mentioned in the *Journal*, 1958, *13*, 412. A bibliography of 1,489 books and bound journals has now appeared under the auspices of the Medical College, University of Cincinnati (1959, x, 171 pp.). Prepared by the Librarian, Joan Titley, it is based primarily on the arrangement followed in the *Index-Catalogue of the Library of the Surgeon General's Office*, Second Series, vol. 17, 89-178, with modifications as necessitated by Dr. Tucker's collection. An index of personal names is provided at the end. Dr. Tucker's books in the fields of general literature and history were given to the Hyde-McCullough Hospital, Oxford, Ohio. His collection of papers, reprints, pictures, and letters has not yet been indexed. Miss Titley departed at the end of May for two years in Europe with the Special Services.

On 23-25 May the Società Italiana di Storia della Medicina held its annual congress at Bologna and Ravenna. At the latter place there was emphasis on Byzantine medicine and on Dante, and the program included

a ceremony at the tomb of the poet. In Bologna the evolution of medical documentation was discussed.

In this connection readers who have access to *Archives,* the journal of The British Records Association, will find in the issue for Lady Day, 1959 (vol. 4, pp. 1-8 and 9-11) two helpful articles on medical records. In the first Charles Newman points out that medical records are made primarily "for current practical use and preserved for a variety of reasons, of which historical research is usually not the most deliberate, but is often the most enduring and far-reaching." In the second Richard A. Hunter provides "Some notes on the importance of manuscript records for psychiatric history." Both these papers were delivered before the Association's Annual Conference on 25 November 1958, which was reported by F. N. L. Poynter in the *Journal,* 1959, *14,* 95-96. In the same issue of *Archives,* pp. 29-44, Leslie Macfarlane outlines the contents and organization of the Vatican Archives; Part II of his article will appear in the next issue of *Archives.*

For one hundred and eighty years the American Academy of Arts and Sciences has encouraged scientific and scholarly research. In March of 1959 it announced that it would award annually three prizes of $1,000 each to the authors of especially meritorious unpublished monographs in the fields respectively of the humanities, the social sciences, and the physical and biological sciences. The final date in 1959 for receipt of manuscripts is 1 October; announcement of awards will be made in December. Recipients will be expected to make their own arrangements for publication. Full details may be procured from the Committee on Monograph Prizes, American Academy of Arts and Sciences, 280 Newton Street, Brookline Station, Boston 46, Massachusetts. Members of the Committee, all Fellows of the Academy, are Howard M. Jones, Brand Blanshard, and Elting E. Morison for the humanities; Clyde K. M. Kluckhohn, Merle Fainsod, and Robert M. Solow for the social sciences; and Philippe LeCorbeiller, Mary A. B. Brazier, and Paul M. Doty for the physical and biological sciences.

In connection with the sesquicentennial celebration of 1960 it is planned to publish a history of the Yale University School of Medicine. The volume will include an introduction by Dean Vernon W. Lippard and chapters respectively on the founding of the medical institution, by Herbert Thoms; on the first century, 1810-1910, by Whitfield J. Bell, Jr. and Elizabeth H. Thomson; on medical research at Yale, by Averill A. Liebow; on the Yale Medical Library, by Frederick G. Kilgour; on the Library's historical collections, by Madeline E. Stanton; and on the modern era, 1910-1960, by John F. Fulton.

In line with the editorial on history in the preceding issue of the *Journal,* the attention of readers may be called to a gently teasing article "From a Correspondent" in the *Oxford Magazine,* 29 January 1959, pp. 202-203. It concerns the teaching of modern history at the "University of

Tristan da Cunha," in those volcanic islands of the South Atlantic to which Britain holds title. Here the one and only professor of history is also vice-chancellor and lighthouse keeper, and since by statute the examination must always include "the continuous history of Tristan de Cunha," he interprets this to mean that the examination must *exclusively* concern itself with the continuous history of Tristan da Cunha. A reforming element has suggested that from time to time and in due subordination to the history of Tristan da Cunha that of other countries might also be studied, but the professor maintains that it takes a lifetime properly to understand the history of Tristan da Cunha alone, "fully to appreciate the niceties of its constitutional status, adequately to understand such social problems as the rise of the gentry (they haven't risen yet—why not?)." Nor should the mediaeval history of Tristan da Cunha be dropped from the syllabus to make room for a certain amount of foreign history. It is by no means certain, he affirms, that Tristan da Cunha was inhabited during the Middle Ages, and even though little or nothing is known about it in that period, so much the more opportunity for research; and there can be no healthy school of history that does not encourage original research. So the history syllabus has remained what it has always been, and the professor has not needed to jettison any of the lecture notes which have done continuous duty for some thirty years. The reforming element intends to return to the attack another year, "vainly, of course; but in a country with no pubs there must be something to take up one's time" in the long winter evenings in the six months or so between calling ships. The reforming element, it should be added, consists of "a character who once sailed all the way to St. Helena and back and has been boring people about Napoleon ever since."

The Schuman Medical Historical Essay Prize

Mr. and Mrs. Henry Schuman of New York offer annually a prize of $250.00 for an original essay written in English, *not to exceed 10,000 words,* on some subject pertaining to the history or philosophy of medicine.

To be eligible, an essay must be written by a doctor of medicine or of one of the medical sciences who has taken his or her M.B., M.D., or Ph.D. degree not more than five years prior to submission of the paper. The competition is open to candidates of any country. Essays which have won awards in other contests are not eligible. The prize-winning essay will be published in the *Journal of the History of Medicine.* The judges reserve the right to withhold the prize in any year if no essay is deemed of sufficient merit.

Entries should be submitted on or before 1 May 1960 to Dr. John F. Fulton, Yale University School of Medicine, 333 Cedar Street, New Haven 11, Connecticut, U.S.A.

Book Reviews

LESTER S. KING. *The Medical World of the Eighteenth Century.* Chicago, University of Chicago Press, 1958. xix, 346 pp. $5.75.

Reviewed by DAVID L. COWEN, *Associate Professor of History and Political Science, University College, Rutgers University.*

THIS volume is a collection of essays, integrated mainly by the light each throws on the medical history of the eighteenth century. Dr. King has not attempted either a chronological or a definitive history of medicine in that century; he seeks instead, by a judicious selection of topics and individuals, to present a panoramic view of the "adolescence of present-day medicine." His essays are neither weighted down with the detailed research of the scholar in search of a footnote, nor are they summations of the opinions and disputations of later-day historians. He has used, almost entirely, published contemporary or nearly contemporary materials, and from them he has made his own analyses and drawn his own conclusions. To these materials he brings a sure knowledge of medical history and a facility in explaining the philosophical concepts of that explosive century. He possesses the medical training and the intellectual flexibility that make it possible for him both to evaluate a given item in terms of eighteenth century medicine, and to relate it to twentieth century knowledge. And to all this, Dr. King adds a clarity of style and a flare for apt literary allusion.

Some of the essays are concerned with medical institutions: the education and ethics of the profession; the roles and relationships of the physician, the apothecary, and the empiric. The other essays are concerned with the development of medical theory and knowledge. They describe the dissatisfaction of eighteenth century medicine with dogmatism and authoritarianism, and its ambivalent groping for a scientific foundation. Boerhaave's works are used as the illustration of this process; they are followed by the works of Pringle, Cullen, and Brown (among other lesser known but significant figures) on fevers; then comes Hahnemann on homeopathy (Hahnemann is included not because his work began in the eighteenth century, but because his system reflected the thinking of that century); then Linné, Sauvages, Cullen, and Erasmus Darwin on nosology; and finally Lieutaud, Morgagni, Baillie, Hunter, and Bichat on pathology.

Fortunately, Dr. King does not follow the credo set down in his preface that history can be put together as if it were a montage of subjectively selected materials, and that the writing of history is akin to the art of the photographer. Instead Dr. King approaches the science of the statistician; his sampling covers the field so extensively, and each segment so intensively, that he comes out with very presentable history. And, since this reviewer would not call it history, if (as Dr. King suggests) it merely "reflects what

the historian wishes to reflect," Dr. King has done better than he bargained for.

The pitfalls of the kind of photographic history that Dr. King proposes but happily does not really practise are more noticeable in the essays on institutions than in those on medical theory. Historical facts do not lend themselves to the same sampling technique that, for example, makes Boerhaave's *Institutiones* an excellent illustration of systematic medicine and makes a multiplicity of such illustrations superfluous.

For example, it seems to this reviewer that Dr. King's medical "world" should also have encompassed the functionary called the "surgeon and apothecary." This medical practitioner was so ubiquitous in the British Isles that in 1779 he outnumbered the combined total of physicians, surgeons, and apothecaries. Similarly, there is but a scant mention of domestic medicine, which, judging from the plethora of manuscript medical recipe books still to be seen, was perhaps the most pervasive condition of the medical world of that day.

And finally, it appears to this reviewer that at times Dr. King treats the apothecary in too cavalier a fashion. The apothecary filled an important need in eighteenth century medicine (and perhaps more importantly as a medical practitioner than as a pharmacist) with perhaps a little more integrity and ability, and with less blame, than Dr. King attaches to him.

These few considerations hardly detract from the over-all value and integrity of each of these essays. Dr. King has produced a work of considerable interest not only to the history of medicine, but also to the history of science.

MARCELLO MALPIGHI. *De pulmonibus.* Ristampa, traduzione italiana e introduzione a cura di Luigi Belloni. Per la fondazione della Società Italiana di Istochimica e i Congressi Nazionali di Anatomia e di Medicina Interna, Messina-Palermo, Ottobre 1958. 70 pp., 1l.

Reviewed by DOROTHY M. SCHULLIAN, *Editor, Notes and Events.*

IN the year 1958 Italy celebrated mournfully the fiftieth anniversary of the devastating earthquake which toppled the crowded city of Messina in the early morning of 28 December 1908. It was not Messina's first. Spallanzani records that certain of Malpighi's anatomical preparations, revered there for more than a century, were lost in the disturbances of 1783. Fate must smile ironically that this edition of his great contribution to microscopic anatomy was issued at Messina in such an anniversary year and that, in fact, any Italian translation of it was needed. Latin, we must concede sadly, is no longer the language of scholars even in Italy.

Otherwise this edition is pure joy, an added demonstration of the generosity and wisdom of CIBA in sponsoring publications in historical medicine and of Professor Belloni's special talents in providing, in attractive format, an accurate text, a faithful translation, and a helpful introduction

for significant works. The edition was initiated by two professional societies desirous of commemorating the foundation of a sister society; the result does honor to all three and to the two anatomists, both at one time or another professors at Messina, to whom we owe the original and now extremely rare edition of 1661.

In a straightforward introduction of 15 pages, which is supplemented by four pages of helpful notes, Professor Belloni traces from published documents the influence exerted by Giovanni Alfonso Borelli upon Malpighi in Pisa, the genesis of the two famous epistles on the lungs which were addressed to Borelli and published in rapid succession in Bologna, and the history of their reception in scientific Europe. The Latin text is based primarily on the original edition, with a few adjustments from later editions. The translation is as straightforward as the introduction and aims solely to help the reader to a better understanding of Malpighi's thought. In this it is successful, and as Harvey's Latin has been interpreted in various languages to a modern age, so now Malpighi's, in which by a magnificent demonstration of the capillary action he confirmed and perfected the discovery of the circulation and founded the science of microscopic anatomy, is elucidated for the modern Italian physician.

The title and first page of both epistles, together with the two plates, are printed in slightly reduced facsimile. Several apposite illustrations from other authors enrich the introduction, and the portraits of Malpighi at the Galleria Borghese in Rome and the Accademia di Belle Arti in Bologna are handsomely reproduced in color. Medical historians will await with much anticipation the Italian translation of Malpighi's *De polypo cordis* which Professor Belloni promises in the introduction. Meanwhile it is to be hoped that remaining copies of his *De pulmonibus* can be transferred, as has been done with other publications of his, to the Istituto di Storia della Scienza in Florence, to be sold therefrom to the benefit both of that eminent institution and of the purchasers.

HILDING BERGSTRAND. *Svenska Läkaresällskapet 150 år. Dess tillkomst och utveckling.* (The Swedish Medical Society, 150 years. Its origin and development.) 562 pp.

Reviewed by BO E. GERNANDT,* *Professor of Physiology, University of Gothenburg, Gothenburg, Sweden.*

AT the beginning of the nineteenth century, members of the medical profession in Europe felt an urgent need to establish scientific societies which would provide an opportunity for discussions of recent developments within their fields of interest. At that time it was difficult for physicians outside of academic circles to gain access to newly printed medical books and current journals and, in addition, they were much too expensive to permit direct

* At present connected with Basic Research Program, National Institute of Neurological Diseases and Blindness, National Institutes of Health, U.S. Public Health Service, Bethesda 14, Maryland.

purchases by most general practitioners. Therefore, the most important function of these medical societies was to provide a reading circle for the membership, although they carried out some of the same activities as our present-day societies.

As early as 1802, two well-known doctors in Stockholm, Eric Gadelius and Jöns Jacob Berzelius, asked for the King's permission to found a medical society. The permission was not granted, however, because of the current political situation. Fearful that the ideas expressed by the French Revolution would permeate his country, King Gustav IV Adolf issued very strict orders concerning the type of literature to be admitted into the country, sold in book stores, or permitted in public libraries and reading circles. The literary situation became even worse later because of the Continental System enforced in 1806 by Napoleon.

After a renewed and more successful attempt, however, permission was finally granted on 31 December 1807 for founding the Swedish Medical Society. During its century and a half of existence the history of the Society has already been written twice. Professor Hilding Bergstrand, one of the former Presidents of the Caroline Institute in Stockholm, has completed its history up to the present day. His aim has been not solely to cover the last twenty years since the previous history was written, but to present a picture of the intellectual, political, and economic background at the time the Society was founded and to describe the relevant changes in this setting during the ensuing years and to show how the irresistible force of time has changed some of the aims and meanings of the Society.

As a consequence of the progressive development of university libraries, the role of the Society as a reading circle soon lost its importance. During this same period, however, the need for performing original medical research became apparent, and soon this trend became recognized as a necessity for the advancement of the medical profession and not just a peculiar hobby. The Society then became a natural forum for intercommunication among colleagues of the medical profession. Other increasingly important roles of the Society have been to provide a medium of communication between the members and the Government about questions of medical importance concerning the country as a whole, to recommend improvements or changes in the training of medical students at the universities, and to render advice to different government agencies.

The Society had hardly shown any manifest interest in the history of Swedish medicine prior to the celebration of its 100th anniversary in 1908. At that time a medical-historical section was added to the other sections of the Society and a temporary exhibition of portraits, manuscripts, prints, medals, instruments, and drugs was opened at the National Museum in Stockholm. Until 1927 these objects of great interest to the historians of medicine remained at the Museum, but at that time the collection consisted of more than 7,000 items and the Museum could no longer house them. Without sufficient space for exhibiting the collection, the Society gradually

lost interest until 1943 when the question of housing was again temporarily solved. A renewed interest arose, and since then some members of the Society have done a magnificent and devoted job of collecting and preserving objects of medical-historical interest.

Similar to any society of importance, the Swedish Medical Society has had its periods of internal weakness due to conflicts among the leading members. But because of the strong need for a Society of this kind and because of the affection with which it is regarded by men of the medical profession, it has always recovered.

While reading this book one gains a charming view of a century and a half of Swedish medicine because it is so intimately bound up with the history of the Society. The continuing local appreciation for the endeavors of physicians elsewhere is reflected in the very restricted list of foreign honorary members elected by the Society. Such names as Du Bois-Reymond, Pasteur, Helmholtz, Virchow, Ehrlich, Koch, Roentgen, Lister, and Bordet will be remembered by generations to come. The estimable Editor of this *Journal,* interestingly enough, is the only American ever elected to such foreign honorary membership.

AUGUST B. HOLLINGSHEAD AND FREDRICK C. REDLICH. *Social Class and Mental Illness.* New York, John Wiley and Sons, 1958. ix, 442 pp. $7.50.

Reviewed by MILTON I. ROEMER, *Director of Research, Sloan Institute of Hospital Administration, Graduate School of Business and Public Administration, Cornell University, Ithaca, New York.*

THIS book reports a ten-year study, conducted in and around New Haven, Connecticut, on the relationships between mental illness and social class. The data, collected painstakingly and tabulated with the utmost statistical caution, demonstrate that persons of lower social status have a higher overall rate of treated mental disorder, that there are significant differences in the class-rates of specific mental diseases, and that important variations characterize methods of treatment of the same disorders in different classes. Evidence is marshalled to suggest that the social class status of a person is not merely a coincidence or consequence, but rather a determinant, of his mental health.

More remarkable, and in the long run perhaps more important, than its findings (for this is not the first study to yield such conclusions) is its methodology. The book is a superior demonstration of integrated research, harnessing the skills of sociology, psychiatry, epidemiology, and even history. To provide a proper basis for understanding the three elements being measured—mental illness, social class, and psychiatric care—the writers give a theoretical analysis and summary of current consensus on each element. Definitions and concepts of mental illness, social class, and psychiatry are presented with remarkable objectivity, considering the degree of controversy that surrounds each of these phenomena.

To readers of this journal, the historical background painted for each element in the study will be of particular interest. The history of the social structure of a New England town is enlightening for its own sake, but the relevance to current mental health differentials among the social classes is particularly meaningful. The same sort of historic background is outlined for social attitudes toward mental disease, the evolution of mental hospitals, and the development of current methods of psychotherapy. The authors are rigorous in defining the limitations of their data, most important of which are their confinement to *treated* rather than total existent mental disease. For this very reason, however, the study is a model of medical-social research, with conclusions not being extended beyond what the data support. Not that speculation and interpretation are avoided; there is much of this—which adds flesh to the skeleton—but it is clearly identified. Many questions are left unanswered, but their very formulation will advance further research in mental health epidemiology in the years ahead.

There is social dynamite in the over-all findings of this study, for they run counter to many popular notions about American democracy. The very discovery of mental disease differentials in persons of different occupation, education, and location (the triad by which class is defined) is evidence for the existence of distinct classes, much as this may be denied in grade-school 'civics' texts. More important, the serious inferiorities of treatment available to lower-class persons is further confirmation of the need for changes in the organization of health service if American ideals are to be realized. The authors leave little to the imagination, and are explicit on these implications throughout the book, especially in the last chapter. In this respect, the book is a valuable addition to the literature of social medicine, which has explored these difficulties in the availability of general medical care for the last century.

Social Class and Mental Illness, this reviewer predicts, will come to be regarded as a classic of medical-social analysis in America. It should be read not only by all persons concerned with mental health, but could well serve as a textbook for students on the research method in all branches of social medicine.

Circulation. Proceedings of the Harvey Tercentenary Congress held on June 3rd-June 8th 1957 at the Royal College of Surgeons of England, London. Edited by John McMichael. Oxford, Blackwell Scientific Publications, 1958. 50s. net. Published simultaneously in the United States by Charles C Thomas, Springfield, Illinois. xxiii, 503 pp., illus. *Part I, Historical Survey, pp. 1-64.*

Reviewed by DOROTHY M. SCHULLIAN, *Editor, Notes and Events.*

THREE times each century, on the anniversary of his birth, of the publication of the *De motu cordis,* and of his death, the restless mind of William Harvey is venerated by those who have followed after in the search for scientific

truth. The celebrations for the year 1957 reached their climax in the international congress which opened in London on the very day on which he died three hundred years before. This volume prints the papers delivered there by sixty participants, to forty-nine of whom, all authorities in the field of cardiovascular research, the technical journals of cardiology will give more extensive attention than can be accorded here. The eleven whose purely historical tributes furnished the commencement and the background for the Congress, together with those of the forty-nine who in office or laboratory or operating room forgot not Clio, can fittingly be listed here.

These eleven represented the countries of England, France, Italy, and the United States. The introduction by Kenneth J. Franklin surveyed pre-Harveian ideas of the blood's movement and, coming appropriately via Fabricius to Harvey, revealed the importance of painstaking translation to the proper understanding of the master's thought. A paper prepared by Fredrick A. Willius and read by T. F. Cotton discussed in historical sequence the several contributions to our knowledge of certain congenital anomalies of the heart and great vessels. But Harvey's work, as we freely recognize with no detriment to his renown, had failed to fit into place one essential arc of the circle, and John F. Fulton explained how with the discovery of the capillaries "an Italian microscopist, a Dutch grinder of lenses, and an English parson applied their genius in the interpretation, extension and development" of Harvey's demonstration.

The purely historical papers delivered at the Royal College of Surgeons closed with a consideration by Sir Charles Dodds of what to a modern age is the appalling anomaly of Harvey, the contrast, that is, between his triumphant researches and the strange treatments which he prescribed as a physician. How shall we reconcile his penetrating intellect, his position as protagonist of the new experimental method, with "powder of ivory and calcaneum cervi," with his abysmal failure in the case of Anne Conway? Two explanations may be offered: he did not associate his discoveries with the practice of medicine, and he had available neither effective drugs nor microscope. So he continued to practise the medicine which had survived since the time of Galen, and Sir Charles hopes that additional research will illuminate still more brightly this extraordinary paradox of Harvey's career.

He who reviews a memorial volume or a Festschrift strives, if he is conscientious, to offer the reader something more than a tedious list of the essays included. The task is easier here because the historical papers which followed formed a cohesive whole on the life of Harvey and because, in the words of A. Dickson Wright, the President of the Congress, and through the courtesy of Messrs. Pfizer Ltd., participants were transported at this point "with infinite care and propriety over the vale of years to spend a few hours in the atmosphere of the Elizabethan England of Harvey's youth." Thus Sir Geoffrey Keynes read at Folkestone the newly discovered letter by which on 17 July 1605 Dr. Lancelot Browne dared "venture life and limb" to secure a Court post for his brilliant young son-in-law, and Tom Hare

sketched in broad strokes the life of the Harvey family in Folkestone's spoon-like Vale, where "food was dear, labour was cheap, life was tough" and in sight of which, on 29 July 1588, "the S.W. wind rose to gale force sweeping the smog of battle and the remnants of the armada into the northern seas, whence less than half returned to Spain." For Cambridge, which is one of the most obscure phases of Harvey's life, a direct lineal descendant of his brother Daniel, Professor F. J. W. Roughton, described in vivid fashion the spartan life of students in his time, the squabbles between Town and Gown, the "subjects useful to medicine" which he studied as Matthew Parker Medical Scholar, and the limited opportunities which were his for attending anatomical demonstrations.

The Congress then moved, this time in spirit, to Padua, the significance of whose atmosphere to Harvey's development was set forth by A. Dalla Volta and A. P. Cawadias, and to France, in which country the doctrine of the circulation of the blood was, in the words of Louis Chauvois, "launched by the Court and popularized by the great writers" beginning with the year 1672. The purely historical papers ended with an honest discussion by Gweneth Whitteridge of her edition of the 1627 *De motu locali animalium,* a tract which in her opinion contains much interesting detail but fails to enhance to any great extent Harvey's scientific reputation.

The historians mentioned above would probably be the first to admit that in these papers there was much which was not really new. In an anniversary symposium one can legitimately take stock (if one does so discerningly) without placing fresh wares upon the shelves, and any new evidence which may come to light in the next two decades need not await the anniversary year 1978 for publication. It is pleasant to add that in the technical papers which form the bulk of this volume there is also much of history. Silvio Weidmann reviewing the more recent findings in cardiac electrophysiology, C. Heymans who, as he discusses baroreceptors and blood pressure homeostasis, believes with Auguste Comte that "to understand a science it is necessary to know its history," G. S. Dawes examining developments of the last thirty years in our knowledge of the foetal circulation, Donald E. Gregg similarly surveying the regulation of the collateral and coronary circulation—all this is history put to the use of the present. Seymour S. Kety furnishes for the cerebral circulation illustrations of Galenic doctrine and of the circle of Willis, and in particular Sheila Sherlock, whose husband D. Geraint James was a moving spirit in the organization of the Congress, calls upon Vesalius and Diemerbroeck in illustration of the portal circulation in man. Present everywhere, of course, is Harvey, and nowhere more cogently than in Sir Russell Brain's concluding address. Let us moreover remember that still today, three hundred years later, there is, as Sir George Pickering reminds us, no substitute in scientific investigation for Harvey's three great attributes—"hard work, exact experiment and exact thought."

This book is carefully edited and its various papers are adequately documented. Its writing is distinctly not "atrocious and [therefore] in the best

medical tradition." Because its whole basis is, after all, history we can rejoice that the historical sections in it are both numerous and helpful.

WILHELM TREUE. *Doctor at Court.* Translated from the German by Frances Fawcett. London, Weidenfeld & Nicolson, 1958. 206 pp. 21s.

Reviewed by W. R. BETT, *MRCS, LRCP, FRSL, London, England.*

"PERSONAL servants and physicians in Royal households are often vouchsafed more insight into the character and personality of their Royal masters than it is possible for the ablest historian to acquire centuries afterwards." Quoting these words of George Johann Ritter von Zimmermann, doctor and confidant of Frederick the Great and of Catherine the Great, Wilhelm Treue describes the aim of his book "to bring together the footnotes to history which he and others like him have left behind in their journals, letters and scientific papers." Despite the author's highly readable style and the excellent translation, these twenty-seven essays will disappoint the medical reader, who will look in vain for references, footnotes, and suggestions for further reading. The chapters vary in length from 2½ to 15 pages, and one might well ask if it is possible to be sufficiently informative about Louis XV of France in 2½ pages and about Queen Victoria in 3½. There is no doubt, however, that the lay public will be intrigued by the narrative, which will tell them much that they had not known about such famous personages as Charles II and George III of England, Louis XIV of France, Peter the Great, the first and the third Napoleon, and Bismarck. The last chapter, "Himmler and Kersten," is historically inaccurate, for according to a White Paper published by the Swedish Foreign Ministry in April 1956, the late Count Folke Bernadotte played a far greater rôle than did Felix Kersten in saving many thousands of victims of Nazi Germany and having them evacuated to Sweden. There is no index.

U. S. ARMY. MEDICAL DEPT. *Preventive Medicine in World War II.* Vol. 4, *Communicable Diseases transmitted chiefly through the Respiratory and Alimentary Tracts.* Col. J. B. Coates, Jr., M. C., Ed. Washington, D. C., U. S. Printing Office, 1958. xxi, 544 pp. $5.50.

Reviewed by JOHN R. PAUL, *Professor of Preventive Medicine, Yale University School of Medicine.*

THOSE who served in the Medical Department of the U.S. Army during World War II can easily imagine the size of the task of documenting wartime experiences about certain diseases in the U.S. Army compiled from many different parts of the world during the years of 1940-1946. Another aspect of this colossal task is that of presenting the data in an interesting fashion some fifteen years after the war is over. Consequently, great credit is due to the editors and the Advisory Editorial Board of this series of volumes for compiling statistics which are so easily forgotten and events which can grow colder and more distant with each succeeding year. It may not be

amiss here to compare this volume with a similar one put out a generation ago by the Medical Department of the U.S. Army ten years after World War I. In the former volume there are good accounts of the Army's experience in the U.S.A. and in France, with a variety of infections and communicable diseases in 1917-1918, particularly the account of the pandemic of influenza. However, the data from World War I were described by officers in the Medical Corps of the Army who could document the *military* experience particularly from a statistical standpoint, but were not necessarily authorities in the diseases which they had been asked to describe. In the present volume on World War II, the chapter on Influenza has been written by Dr. T. Francis, Jr., those on the exanthemata by Dr. Joseph Stokes, Jr., diphtheria by Dr. Aims C. McGuinness, streptococcal infections by Dr. Lowell Rantz—all acknowledged authorities on these diseases. The fact that the Editorial Board for this series of volumes was able to get authorities in these fields to write the various chapters on the medical history of that war is something unique. It goes back to the foresight and leadership of the late Brig. General James S. Simmons, who in 1941, with the able assistance of the late Dr. Francis G. Blake and Brig. General Stanhope Bayne-Jones, established what was known contemporaneously as the "Army Epidemiological Board." This Board did much to tackle, solve, and describe the colossal problems of infectious disease in wartime and to draw upon the knowledge of civilian doctors who worked closely with the military. So effective was this venture, indeed, that the Board is still in existence.

Because of the authoritative standard of most of the chapters in this book, it can occupy a place not only as a record of military medicine but as a textbook on the wartime behavior of infectious disease. It should be useful for clinicians and for students of statistical and clinical epidemiology as well as those interested in medical history of World War II. It may be brash to suggest that in no previous war has there even been such an *authoritative* wartime record of the military and epidemiologic behavior of some 24 common and important communicable diseases, but with this brash statement the reviewer is in complete accord.

FELIX MARTÍ-IBÁÑEZ. *Men, Molds, and History.* New York, MD Publications, Inc., 1958. 114 pp. $3.00.

Reviewed by LESLIE A. FALK, *Lecturer in Medical Care, University of Pittsburgh, Graduate School of Public Health, Pittsburgh, Pennsylvania.*

MOLDS create what have come to be the most commonly administered medications for the treatment of infections, both in man and animals. Over twenty are now in clinical use. They have found their essayist and poet in Dr. Martí-Ibáñez, medical historian, psychiatrist, and editor. He writes about them with imagery, imagination, and insight—indeed as a window to the world—in essays that are learned, witty, and romantic. Martí-Ibáñez is editor of the monthly magazine *MD.* The attractive little volume reviewed here constitutes a collection of several of his statements and addresses on

antibiotics—and the universe. Five of the chapters were given at Annual Symposia on Antibiotics held in Washington, D. C. (1953 to 1957). Four are reprinted from *Antibiotics and Chemotherapy* (of which the author is International Editor), and one from *Antibiotic Medicine and Clinical Therapy*. Another is from a volume in Spanish on antibiotics. Another is from the *International Record of Medicine* of which Dr. Ibáñez is Editor-in-Chief, and one from General Practice Clinics. In his antibiotics endeavors, Dr. Martí-Ibáñez has been associated with Dr. Henry Welch, Director, Division of Antibiotics, Food and Drug Administration, Washington, D. C. He eulogizes Dr. Welch in the introduction and epilogue (a somewhat contrary view is presented in *The Saturday Review of Literature*, pp. 46-48, Feb. 7, 1959 by Mr. John Lear).

The historical, philosophical, medical, and social place of antibiotics is discussed. This history of antibiotics is traced from empirical folk-medicine origins, which, Dr. Ibáñez believes, included the "yeast of sweet beer" of the Ebers papyrus, the Chinese use of soy-flour poultices and the Mayan Indians' use of green molds (penicillia). However, he explains why medical theory in earlier centuries made it almost impossible to develop the antibiotics more highly at an earlier date. He refers to the nineteenth century origins of the development in the work of Pasteur, Lister, and others. The volume is not, however, and does not pretend to be a systematic history of antibiotics. For this, one can look to a far worse place than the Antibiotics number of this *Journal*. An essay on "The Philosophic Impact of Antibiotics on Clinical Medicine" includes a strong plea to the pharmaceutical industry, repeated in other of the essays, to establish chairs of antibiotic medicine and an International Institute of Antibiotics with a collection and a museum of antibiotics history and development.

An obituary tribute to Sir Alexander Fleming, discoverer of penicillin, is done with warmth and feeling. But the author quite correctly recognizes the planned research of Dubos, Chain, Florey, and Waksman as key contributions to the further development of the "prepared mind" observations of Fleming concerning lysozyme ("the body's own antibiotic") and then penicillium.

Martí-Ibáñez comments on the phenomenon of the "medical magic" tendencies of any new drug, explaining that many people consider an ampule of penicillin to have as much power as a talisman or religious image held in times past. He makes clear that all too many physicians still do not decline the role of priest. He hints at the vast indiscriminate use of these agents, such as in treating the common cold or "flu" with them, with the development of sensitized patients and of resistant organisms. It would have been difficult for him to note that the pharmaceutical companies with their "detail men" and their advertising agents mislead both the doctor and the public, and thus play a great part in stimulating the indiscriminate use of antibiotics, with the public demanding "a shot of penicillin," which becomes difficult to resist, the way our medical care is organized.

From antibiotics to the "patient as a whole" is a step which the author negotiates in a sprightly fashion. Medical communication, a field in which he is a master, is dealt with in its historical and sociological perspective. In his last chapter, the art of translation is discussed. There is a (too) limited bibliography and also an index. The volume is designed in good taste, is well printed and bound. It contains a collection of humanistic addresses which have historical information and perspective. They make worthwhile reading.

LYCURGO SANTOS FILHO. *Uma Comunidade rural do Brasil antigo.* [A rural community in old Brazil.] São Paulo, Companhia Editora Nacional, 1956. xxiii, 447 pp., 16 engr.

Reviewed by FRANCISCO GUERRA, *Research Associate, Department of the History of Medicine, Yale University School of Medicine.*

THIS is the story of one of the most famous ranches near Bahia, told of a period of 15 years in its history in the eighteenth and nineteenth centuries. Life on the "Brejo do Campo Seco" is described in relation to its historical, economic, and social environment. This interesting study of the past has been made possible by careful reconstruction and selection from among hundreds of papers and documents preserved in the archives of the ranch, which used to belong to the Pinheiro Canguçu family.

The medical interest of this book lies in Chapter XIII [pp. 191-204], which is devoted to a study of the medical practice of the period in question, when every ranch-owner was, in effect, a medical practitioner. Their treatments were usually based on the well-known book published by the French author P. L. N. Chernoviz, 'Dictionary of Popular Medicine' (1842-1843). Santos Filho reproduces many prescriptions used on the ranch and lays particular emphasis on the use of Brazilian plants in the treatment of venereal and tropical diseases then so prevalent.

Medical historians owe him a debt of gratitude, not only for this interesting contribution to the knowledge of Brazilian medicine in a period when first-hand information is difficult to encounter, but also for his careful identification of plants when discussing the materia medica of Brazil during the eighteenth and nineteenth centuries, which until this time had only been known through the work of Silva Araujo.

There is an Appendix, with the Statutes of the Santa Casa de Misericordia de Caetité inserted as an example of the organisation of medical institutions of the period in that area. There are several other chapters on cattle-raising and agriculture, where the student of veterinary medicine and agriculture will cull much interesting information.

Dr. Lycurgo Santos Filho is well known for his most important 'History of Medicine in Brazil' (1947) which is, unfortunately, very rare nowadays; many scholars the world over are looking forward to the appearance of a second edition of this work.

HARRY ECKSTEIN. *The English Health Service. Its Origins, Structure, and Achievements.* Foreword by James Howard Means. Cambridge, Mass., Harvard University Press, 1958. 289 pp. $5.50.

Reviewed by IRA V. HISCOCK, *Anna M. R. Lauder Professor of Public Health, Yale University School of Medicine.*

THIS book is published under the direction of the Department of Government in Harvard as one of the Harvard Political Studies. It was written by a Professor of Government, who "spent two years in England." One's surprise at the title—English Health Service—and at the not infrequent interchangeable use of the title and terms *British* medicine and *British* National Health Service in the text is relieved somewhat by reading a late paragraph in the Preface: "Throughout the book I use the terms English and British interchangeably. Strictly speaking this is misleading since I am concerned here only with the English and Welsh Health Service, the Scottish being different in several respects. But it would be both tiresome and pedantic to remove the word British wherever it has slipped spontaneously into the text."

An approach to this complex subject by a non-medical specialist in government is enlightening. The condition of British medicine before 1948 and the extent to which the Health Service has been successful have been examined in some detail. Professor Tittinus and others in England reviewed the text. How much it adds in depth and breadth to previously published books in England and America may be questioned, especially as to the social component of medicine. The successes and failures nearly balance one another out. The author believes that most of the fears of the opponents of the Service were unwarranted. He indicates that the doctor-patient relationship has not deteriorated because of over-demanding patients, slovenly doctors, or arrogant officials. He indicates that the cost has not been excessive. But he shows that medical services are still in short supply. In an epilogue: planning section, the author states that ". . . the Service presents a large area of irrational administration and a record of considerable failure; yet one need only glance at the state of the old medical system to see that there is a record of considerable improvement as well." The author reminds the reader that the Health Service Act was a "doctor's measure" much more than a "patient measure"; it was intended to correct serious faults in the organization and quality of the British medical services rather than in their class distribution. Added to an analysis of origins, there is a useful discussion of objectives, a sketch of organization, and a chapter indicating how well the service operated in the light of its purposes.

This book can be especially valuable for the American reader and student of medical care plans. It can be a useful source book for students and administrators in public health and in government, bearing in mind, however, that this development was based on many years of thought and exploration and obviously and admittedly relates to a specific locality in its details. Yet there are useful lessons for the United States.

STANISLAS KONOPKA. *Les Relations Culturelles entre la France et la Pologne dans le domaine de la Médicine.* Varsovie, Société Polonaise d'Histoire de la Médicine, 1958. 22 pp.

Reviewed by BRUNO KISCH, *Curator of the Edward C. Streeter Collection of Weights and Measures, Yale Medical Library.*

THIS small booklet is a short outline of the connection between outstanding physicians from Poland and the medical world of France. It recalls a few men of the early nineteenth century who are not very well known to scientists in other countries, for example, Charles Kaczkowski, Severin Galezowski, Adam Raciborski, Louis Maurice Hirschfeld, and others. Probably the most interesting and romantic account is the life story of Hirschfeld, of whom there exists in the collection of this reviewer a beautiful bronze plaque made by a Polish artist.

If, as may be supposed, this small booklet is only the precursor of a larger volume, then of course the omission of the most outstanding personality who belongs in this group can be corrected; that is Robert Remak who all his life was an ardent Polish patriot, confessing this publicly to his own disadvantage. He published books and articles in the Polish language and even once received a call to the chair of physiology in a Polish University. Remak had close connections with the medical world of France, was a friend of Claude Bernard, and published his work on many occasions through the Academy of Sciences in Paris.

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